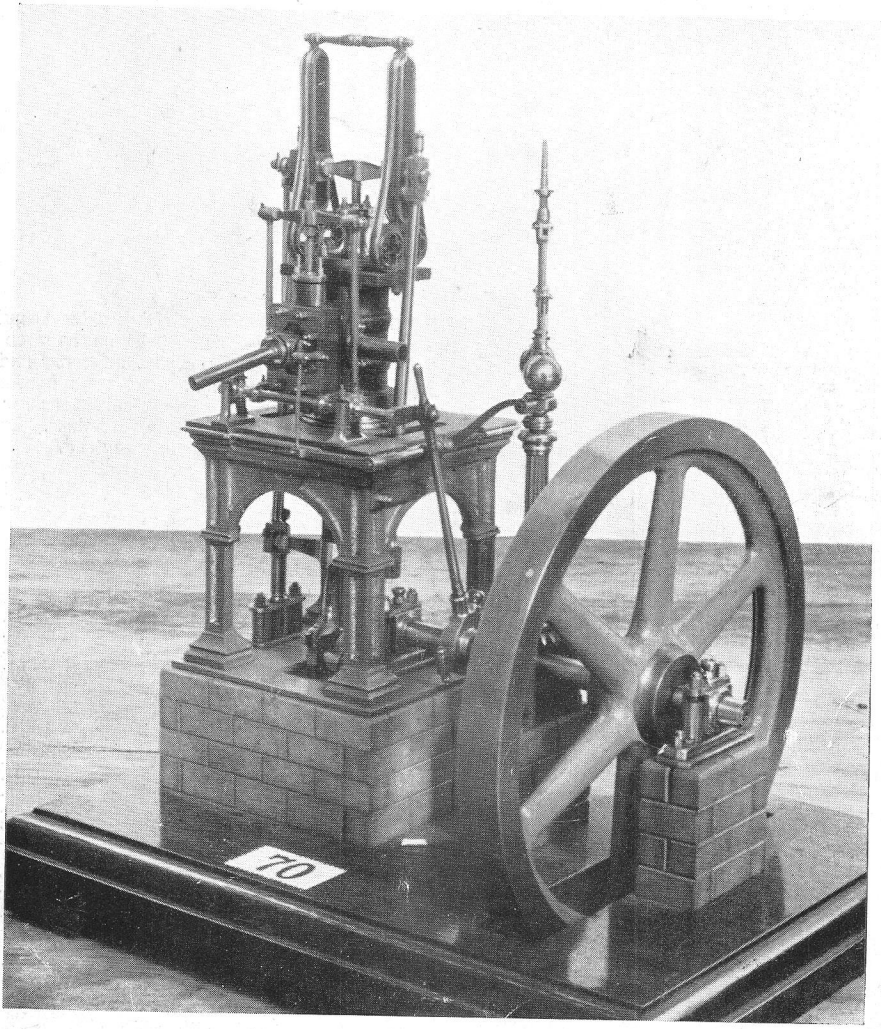
THE MODEL ENGINEER

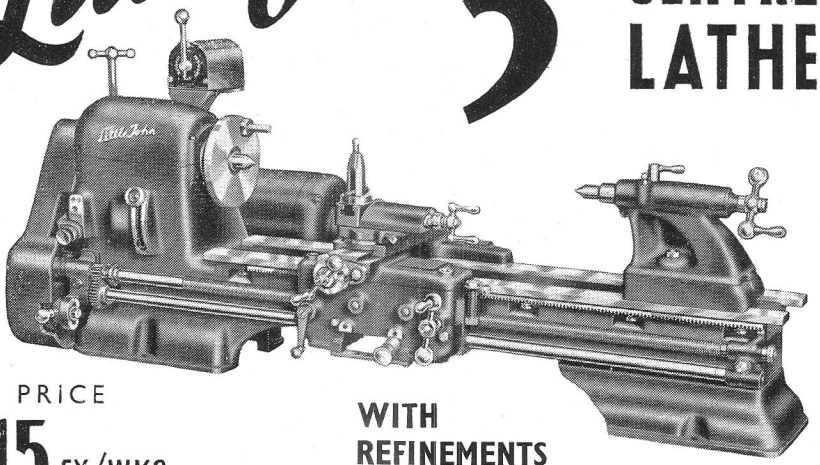
Vol. 95 No. 2371 THURSDAY OCTOBER 17 1946 6d



A Model "Tuxford" Table Engine

This dainty miniature model, constructed by Mr. H. A. Braithwaite and shown at the recent "Model Engineer" Exhibition, brings back memories of the days when engineers were allowed to be artists as well as craftsmen

The Little John 5" CENTRE LATHE



PRICE

£115 EX/WKS.

Complete as illustrated, including 3-phase electrical equipment. Accessories also available. **£1 10s. 0d.** extra for single-phase; **£5 0s. 0d.** extra for D.C. H.P. terms can be arranged.

Sole Agents–Home and Export:

The Acorn Machine Tool Co. (1936) Ltd., 610-614, Chiswick High Rd., London, W.4

WITH REFINEMENTS

hitherto associated only with high priced equipment

One simple lever movement gives an **infinite** spindle speed range of 1750 to 290 r.p.m. ungeared and 260 to 38 r.p.m. with back gearing. Bed ways hardened and ground. Simplified change wheel selections for cutting threads 3 to 48 per in. Separate feed-shaft. Leadscrew instantly disengaged when not required. Timkenised spindle, bored for 1-in. bars. Detached power feeds with micrometer dials. Swing over bed, 10¼ in., over saddle 6½ in. A sturdily built machine, easy to handle and dependable for long life.

SPECIFICATION

SPINDLE.—Amply proportioned, and bored to pass 1 in. dia. bar. Nose has two locating positions, the threaded position being used for tightening purposes only. True running is thus permanently assured. Timken roller bearings are fitted as standard.

HEADSTOCK.—Cast integral with bed.

SADDLE.—Sturdy construction with conveniently arranged controls. Traverses are by means of feedshaft which provides power feed both longitudinally and crosswise. Micrometer dials, reading in thousandths, are fitted. The leadscrew is used only for screwcutting and thus maintained in good condition over a lengthy period.

BED.—Rigid construction and ample weight. Fitted with two hardened and ground steel slides of ample section. Wear practically eliminated and alignments maintained indefinitely. Replacement is simple should it become necessary.

SCREWCUTTING. Reference to the chart will show the requisite change wheels and indicate their position in respect to studs A, B, C and D. Slip washers permit quick assembly. Change wheels are supplied for all normal threads, but others are available for special or metric threads.

DIMENSIONS.

Height of Centres	5⅛ in.
Swings over Saddle	6½ in. dia.
Admits between Centres	24 in.
Bore of Hollow Spindle	1 1/32 in.
Spindle nose bored	No. 4 Morse
Size of Centres used	No. 2 Morse
Dia. of spindle nose	1⅜ in.
Spindle nose threaded	6 T.P.I.
Leadscrew, ⅝ in. dia.	8 Thds. per inch
Width of Bed	6⅛ in.
Width of each hardened slide	1½ in.
Overall length of Bed	43 in.
Length of Saddle	9⅝ in.
Cross feed travel	5 in.
Toolpost Slide travel	2½ in.
Feedscrew graduations	0—.1 by .001
Micrometer dial dia.	2 in.
Motor, ½ h.p. (A.C. or D.C.)	1425 r.p.m.

SPEEDS AND FEEDS

Spindle ungeared	1750—290 r.p.m.
backgeared	260—38 r.p.m.
Longitudinal traverse	.003 to .050 per rev. of spindle
Screw Threads cut	3 to 48 per in.
Metric	.25 to 4 mm.

Overall dimensions—4 ft. by 2 ft. 1½ in. by 1 ft. 9 in.

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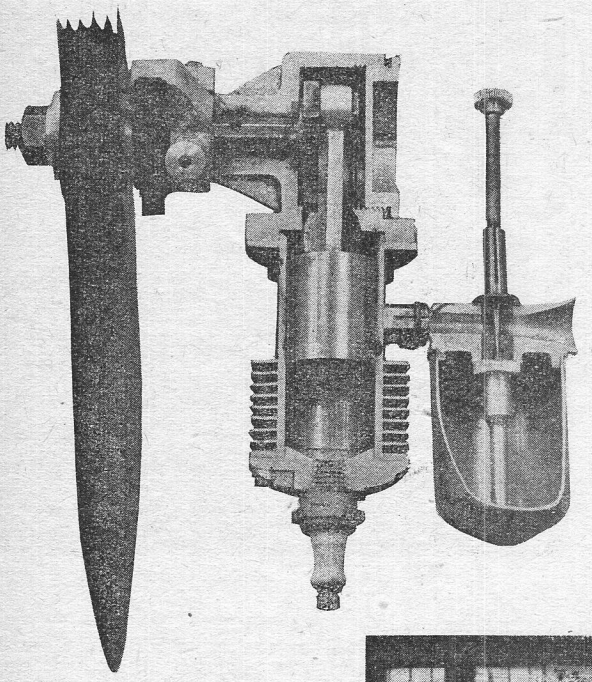


A sectioned model of the "Astral" 6-c.c. engine

I trust I shall not be asked to particularise on these details, as I do not wish to make a specific criticism of any individual engine; no doubt the makers of all engines are feeling their way at present, but one cannot help thinking that they might have taken better advantage of the up-to-date knowledge of design now available, and most of which has been published in THE MODEL ENGINEER.

For the first time, a British-made compression-ignition engine has made a public appearance; namely, the 1.3-c.c. Mills engine, several pre-production models of which, both upright and inverted types, were displayed on the stands of Messrs. Mills Bros. Ltd., and E. Keil, Ltd. This little engine appears to be very accurately made, embodying features of design comparable with those of the best Continental makes, including provision for cutting out the engine by time-switch control at the end of the run. From the test figures furnished, it would seem that the performance is very high and durability better than of most engines of this type.

The running qualities of two makes of British engine can be attested to from first-hand personal experience; namely, the Gerald Smith range of engines, and the Majesco 4.5-c.c. engines, both of which have been reviewed in THE MODEL ENGINEER. Three sizes of engine, the "Redwing" 7½-c.c., the "Lapwing" 10-c.c., and the "Magpie" 15-c.c., with no less than fourteen variations of detail and arrangement, were shown in the neat showcase display of the former exhibitor, and elicited universal admiration for their excellent design, workmanship and finish, which are more typical of what one expects to find in an individually-made exhibition model than a commercial product.

On the stand of Majesco Miniature Motors Ltd., a range of exhibits showing the progress of the Majesco 4.5-c.c engine through its experimental and production stages, also a sectioned model showing the internal working parts of this engine. Castings and parts of the engine are also available. The latest product of this firm, a

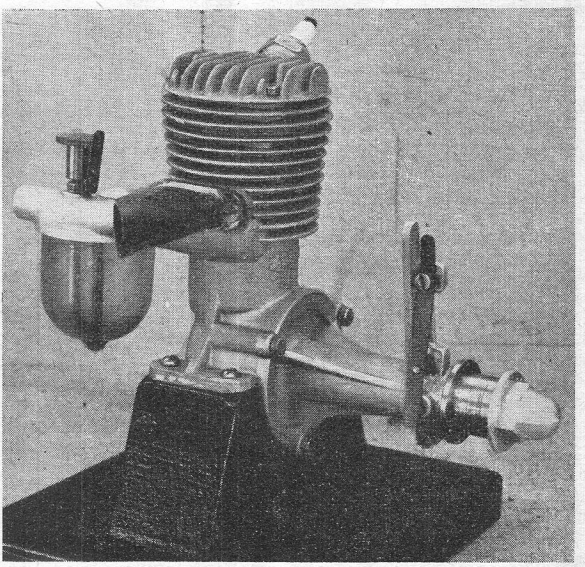
The display of 7.5 c.c., 10 c.c., and 15 c.c. engines by Gerald Smith

10-c.c. engine now in course of development, deserves mention, as the only commercial example of an engine with rotary-valve admission to be seen at the Exhibition.

Sectioned engines were also shown by the Astral Aero Model Co., and Ten-Sixty-Six Products Ltd. The former example features an inverted 6-c.c. engine, having a fabricated steel cylinder with detachable head, one-piece crank-case with screwed-in rear endplate, and carburettor with attached metal bowl-type fuel tank.

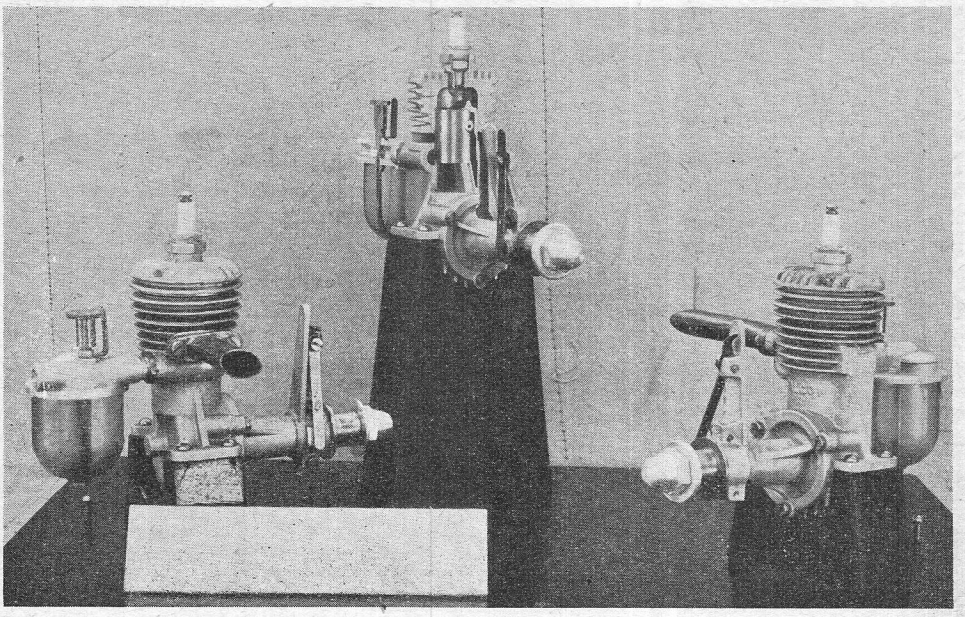
In the "Falcon" engines exhibited by Ten-Sixty-Six Products, die-castings are used throughout, and in addition to finning of the cylinder-head and barrel, the bottom of the crankcase is also finned. Examples of the "Falcon I" 5-c.c. engine and the "Falcon II" 10-c.c. engine were shown, the general features of the latter being much the same as that of the smaller engine, except that the sparking plug, instead of being situated vertically in the centre of the head, is inclined and located over the transfer-port side. This feature reduces the overall height of the engine.

Other interesting engines to be seen in this section included the "K6" 6 c.c. engine by Messrs. E. Keil Ltd., and the Atlas 3.5 c.c. engine, both of which were fairly typical of the general tendency of commercial practice. Castings and parts for the latter engine are available.



The "Falcon" 10-c.c. engine

With regard to accessories for model petrol engines, such as ignition coils, sparking plugs, flight timers, etc., these were shown by most of the exhibitors mentioned above, and in respect of design, call for no special comment.



"Falcon I" 5-c.c. engines, one of which is shown in section

THE

MODEL ENGINEER

Percival Marshall & Co. Ltd., 23, Great Queen Street, London, W.C.2

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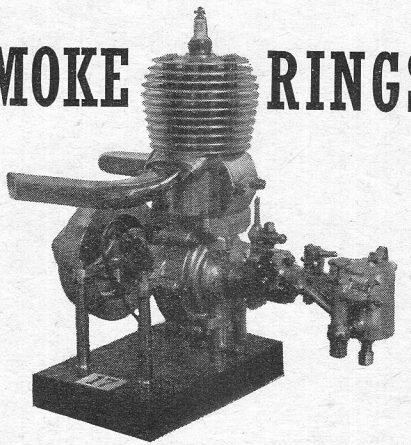
SMOKE RINGS

Exhibition Model Finish

HOW far is a super-finish justified on models intended for exhibition purposes? I ask this question not necessarily arising out of our own Exhibition, but in the interests of realistic modelling generally. There is a certain ship model on view in Kingsway which annoys me every time I pass the window, because the hull is decorated with brass railings round the deck. I know quite well that if ever I make a voyage on that ship I shall not rest on brass railings when I lean over the side to admire the sunset. Brass may be the most suitable material for making the model railings, but why not apply some appropriate colouring to the metal to make it look like the real thing? Anchors, anchor-chains, deck-winches and davits in brass similarly appear on otherwise exquisite ship models and are equally irritating to the true ship-lover and model maker. Even locomotive models at exhibitions are not immune from over-finish, particularly in the super-polish applied to motion details. I have at times seen engineering models either partly or wholly electro-plated, looking like nothing that ever drew a breath of live steam. What effect has the builder in mind? Is he trying to show a model of a real prototype or to make something which is a pretty ornament and nothing more? No trouble can be too great which concerns itself merely with good painting and lining and with applying an appropriate degree of good finish to the visible metal parts. But why gild the lily, or aim at effects which are out of all keeping with the standard set by the prototype? What makes Dr. Bradbury Winter's famous "Como" such a perfect model of a locomotive? One contributary cause is undoubtedly the immaculate realistic finish so absolutely in keeping with the smart, but not over-smart, character of the Brighton Company's locomotives of the pre-grouping era. They were artistic gems, and yet fully satisfying to the engineering eye. So it is with the "Como." I know the many hours of patient work which were put into the painting and re-painting of this model to obtain that smooth and glossy coat so exactly like the colouring of the prototype. I know the precision with which every motion detail was fashioned by the builder.



Yet what a tragedy it would have been if this perfect miniature had been marred by shiny enamel and glittering electro-plate. So-called "exhibition finish" is really a will-o'-the-wisp which may well lure the aspiring model maker from the true and straight path of honest realism into the jungle of mis-applied make-believe, offending to the mind and eye of every lover of realistic accuracy.

A Newport Revival

I AM glad to hear that the Newport (Mon.) Society took on a new lease of life at its meeting on October 7th. This club has been dormant during the war period but the spirit still survives and some attractive meetings are in early prospect. The Hon. Secretary, Mr.S.Marshall Hall, writes: "THE MODEL ENGINEER during the war was our chief link with sanity and the good old days. I would like to extend my sincere thanks to yourself and all concerned in its production for the help and encouragement you brought to us during the hard times just over." So rally round Newportians and contact Mr. Marshall Hall at 102, Fields Park Road, Newport.

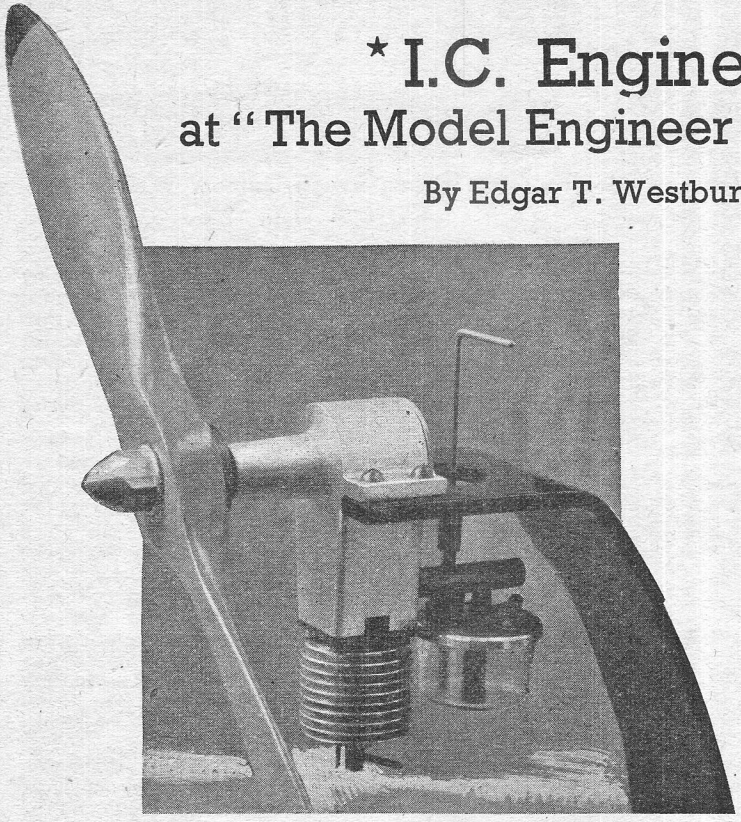
Worthing's Good Start

ONE of the newest Societies in the south is that at Worthing, where no less than 40 members were enrolled at the first meeting. A generous supporter has presented a complete lay-out for both "O" and "OO" gauges for operation by the club, and the use of the hall for fortnightly meetings has also been promised by another friend. Those well-known local enthusiasts, Mr. and Mrs. Austen-Walton, are taking an active interest in the welfare of the Society, and since a large proportion of the membership consists of skilled model makers success is assured. Mr. T. J. Austen-Walton would be pleased to hear from other prospective members at 27, Ham Road, Worthing.

Percival Marshall

*I.C. Engines at "The Model Engineer" Exhibition

By Edgar T. Westbury



The 1.3-c.c. Mills compression-ignition engine

ONLY a brief mention can be made here of the many I.C. engines which were to be seen in the collections of models displayed by various model engineering societies, mostly installed as power units for model aircraft, boats, or cars. A review of the models in the former class will appear in our companion journal, *Model Aircraft*, while the cars will be dealt with in *Model Car News*; however, it may be mentioned that in both these classes of models, commercially-powered engines, mostly of American manufacture, are extensively employed; and apart from one or two unusual types, such as the "flat-four" two-stroke in Colonel Bowden's flying-boat, and the record-breaking Hornet engine in Mr. Zere's Dooling car, these do not provide so much interest from the model engineering point of view, as engines of amateur construction. Of the latter, it may be observed that several cars were fitted with Hallam and Kestrel engines, and a number of power units under construction were featured.

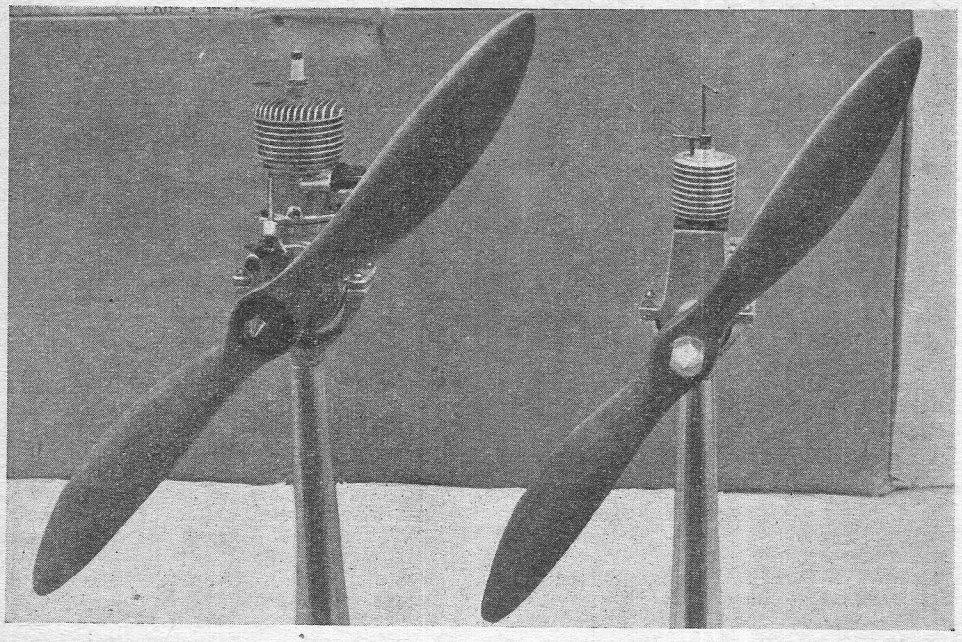
Most of the boats shown on the Model Power Boat Association stand were steam-driven, but a notable exception was the beautifully-finished miniature by Mr. A. Weaver, of the Victoria M.S.C., with its inclined-valve 10-c.c. four-stroke engine, the detail work in which was comparable with that of any I.C. engine in the Exhibition. A "sister ship" to this, by the same constructor, was shown on the stand of the North London S.M.E.; and he was also responsible for some interesting exhibits on the Pioneer Model Racing Car Club stand, a model racing car of the E.R.A. type, with an original 5-c.c. two-stroke engine, and a partly-constructed vee-twin four-stroke engine, which is understood to be intended as the power unit for a model Morgan runabout three-wheeler.

Trade Exhibits

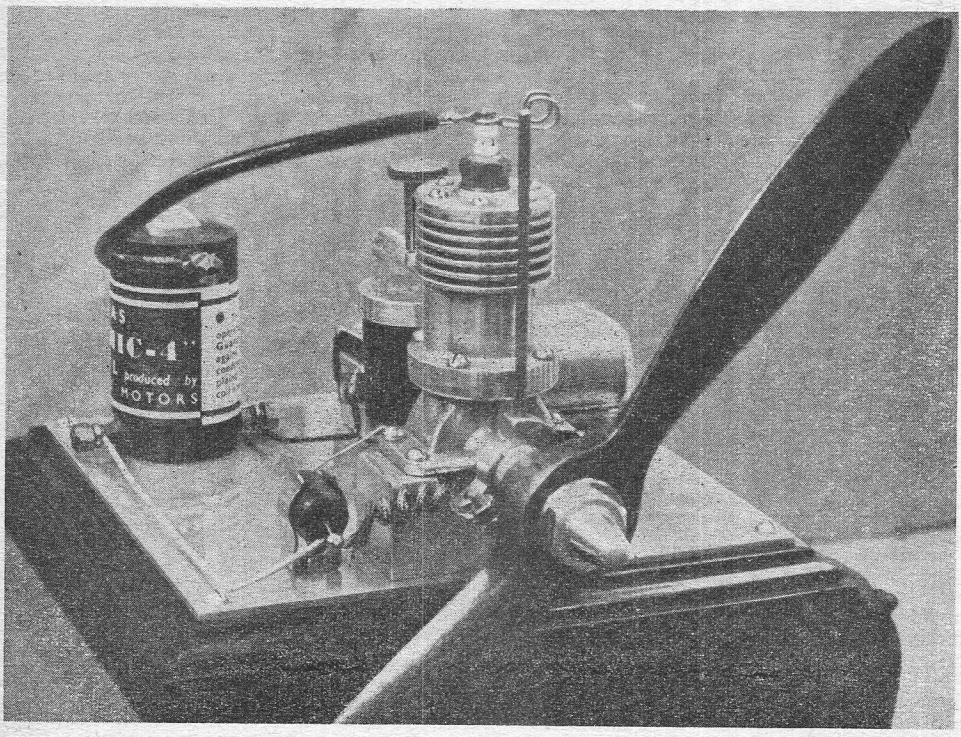
As already mentioned, all the commercially-produced engines were of the two-stroke type, and intended primarily for model aircraft, though castings for engines of the four-stroke type were featured on at least one stand, that of Messrs. G. Kennion & Co., who appear to find that there is still a steady demand among constructors for the castings of such old favourites as the "Kiwi," "Kittiwake," "Kestrel," and "Kinglet" engines. There is, however, considerable scope for the introduction of new and progressive designs, with castings and parts, specially intended for the amateur constructor; and it is hoped that the attractions of the ready-made engine will not completely divert attention from the possibilities in this direction.

It is very gratifying to note that British model manufacturers are at last taking a serious interest in the production of model petrol engines. Of the various engines shown on the trade stands, all, without exception, appear to be very well made—from a superficial inspection, it would seem that they are better than the rank and file of imported engines—and should perform reasonably well and have a long working life, provided that the materials used, and the accuracy of the working parts, are in keeping with the appearance. The general standard of design is, perhaps, open to some criticism, as some of the details of these engines reveal certain ancient and dubious features which, one might have expected, would long ago have been searched out and corrected.

*Continued from page 336 "M.E.," October 3, 1946



The "K.6" petrol engine and the Mills 1.3-c.c. compression-ignition engine shown by Messrs. E. Keil Ltd.



The "Atlas" 3.5-c.c. engine and ignition equipment

"L.B.S.C."

TROUBLE-SHOOTING

READERS who regularly follow these notes occasionally write to ask for the inclusion of a few notes dealing with such things as tracing and correcting faults, making "silk purses out of soused mackerel," as the late Dan Leno used to say, and other "side lines" in locomotive building, maintenance, and running. Locomotives both large and small, have their failings, same as human beings; they fall sick for no apparent reason, or they fail in performance, due to faults in design, construction, or both. I have known cases where the successful running of an otherwise perfectly good engine, has been utterly and completely spoiled by one trivial fault. For example, one of the tank engines at the depot where I worked, suddenly developed into a shy steamer. As it was one of "old man Billy's" productions, it was a safe bet that the design hadn't failed; and there did not seem to be anything mechanically wrong with it. After the driver had "booked" it several times, and it did not show any signs of improvement, he went into the matter himself; and being one of those plodding and methodical souls who start at the beginning, and carry on until they achieve their object, he first "tried over" both valves and both pistons, to see if any blow-by was taking place and wasting the steam.

Incidentally, followers of these notes often ask how they can trace a blow without pulling the engine to pieces, same as a driver of a full-size engine would do—or rather as the old-timers did; judging by what I have seen and heard, some of the younger ones of the present day neither know nor care. "Leave it for the next man," is their motto; the direct outcome of the mistaken "economy" of pooling the locomotive stock. When every driver had his own engine, he looked after it, in his own interests, and thereby kept the maintenance and running costs down. There lay the road to *true* economy; 'nuff sed! However, reverting to the query, if all goes well we will have a lobby chat about it in the not-too-distant future, and your humble servant will endeavour to "spill the beans" in the usual manner.

Our friend mentioned above, found the "works" all in order, and also that the smokebox was airtight. He also put two sticks crosswise over the top of the chimney, tied a $\frac{3}{4}$-in. nut on a piece of string, and attached it to the cross, dropping the nut down the chimney On opening the smokebox door, the nut was seen to be slap in the middle of the blast-nozzle, so there was evidently nothing wrong with the alignment; but he noticed that the ashes around the back of the blast-pipe base seemed a bit rough-seaish, in a manner of speaking, so he raked them away, and did a bit of Sherlock Holmes around the bottom of the smokebox. The source of the trouble then came to light. The joint between the bottom flange of the blast-pipe and the cylinders, had developed a blow in the direction of the tube-plate, not only upsetting the smokebox vacuum, but impeding the flow of burnt gases from the bottom rows of tubes. After the blast-pipe had been taken out, and the joint remade, the engine steamed better than ever.

"Congestion of the Lungs"

One of my few personal friends has a G.W. 4-6-0 which has put up several good performances on my own road. It was built some years ago, when his equipment was none too grand; and having rebuilt and extended his workshop, and taken delivery of a new lathe, he thought it was time to give the engine a birthday treat, and make a few improvements, so got busy. To his great dismay, when the job was completed and the engine steamed up, she was slow and lacked power; in fact, would hardly run with her own tender. He thought something had happened to the valve-gear, such as shifted eccentrics, but could find nothing wrong; and after several evenings became a bit despondent. At last, prompted by his fair lady, he told me his troubles over the telephone, so I said, "Bring the engine along and let's have a looksee." He did, and we jacked her up on my bench and connected a tyre pump to the feed pipe. With full pressure showing on the gauge, the wheels only turned slowly, but they turned equally well in either direction, which showed that there was nothing amiss with the valve-gear. On holding the wheels against pressure, there was no blow up the

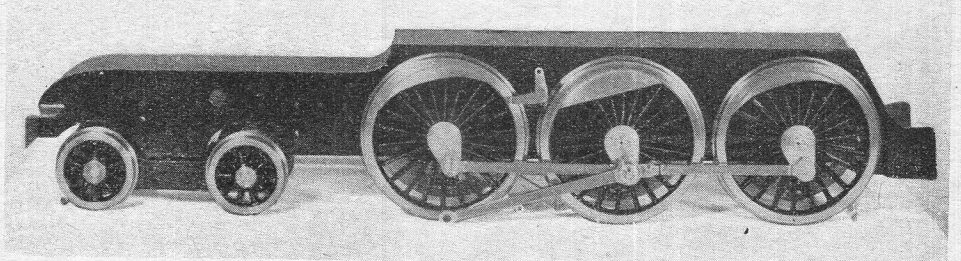


Photo by] *Part of a "Hielan' Lassie," by Mr. James Robb* [*D. Mehaffey*

chimney; and when first gripping them, they made no effort to turn, but seemed to try to get away after being held for a minute or so. There was only one cause for that, viz.: some obstruction between regulator and cylinders; but my friend couldn't see how such could be the case, as she was all right before, and the inside of the boiler was clean. However, there it was, and the obvious thing to do, was to find out and remove the obstruction. On disconnecting the superheater union, very little air blew from the pipe, so off came the boiler, and the superheater element was removed. On trying to blow air through the element, the location of the blockage was revealed, as hardly anything would pass. I noticed there was a return bend on the end, where originally there had been a spearhead joint, and asked my friend if he fitted this when overhauling; he said yes, but didn't think that could have made any difference, *as he fitted it over the original spearhead.* That was exactly the trouble! The heat of

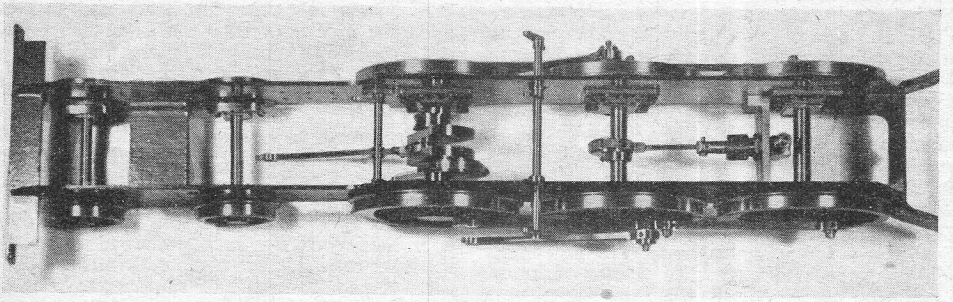


Photo by] *Mr. Robb shows that Belfast can make it* [*D. Mehaffey*

the brazing job, when fixing the copper block, had melted the original brazing of the spearhead, and the metal had run inside and stopped up the hole.

An application of the hacksaw close to the bend, soon proved the truth of the above; the spearhead was practically solid. Well, thought I, a little help is worth a great deal of pity; we'll make certain *that* doesn't happen again! It was only the work of a few minutes to clean the ends of the element, saw out and drill a little return bend from a bit of flat copper bar, and fit it to the element. A smear of Sifbronze flux, about fifteen second's heat-treatment with the Alda blowpipe, using No. 75 tip, plus a touch of Sifbronze No. 1 on each element where it entered the block, and the new return bend was fixed to the elements for good and all time, perfectly steam-tight, with a full-bore steam way at the bend. A test with the air-pump proved everything O.K., and my friend went on his way rejoicing. In the course of a couple of days he telephoned me that the engine was now O.K. and running better than ever. The motto of both the above incidents is, that if there should be a fault in your engine, don't make any haphazard guesses as to what *might* be the cause of the trouble, but start from the beginning, and work right through, like a ferret after a rat. You'll find the trouble much more easily that way.

Never Again!

Nobody can accuse old Curly of refusing a helping hand, where time and circumstances permitted, to a friend in difficulties with his locomotive work; but there is one thing that I will *not* do for anybody, any more on this earth, and that is, try to make a good working locomotive out of a useless dud. Old readers of these notes don't need reminding that I *have* done such jobs in the past, and got a certain satisfaction out of the conversion, also from the pleasure it gave to the owner; but my last experience of this sort of thing has definitely been "the straw that broke the camel's back." This is how it came about.

Some time ago, a correspondent up in the West Midlands wrote for advice, saying that he had purchased a used 2½-in. gauge L.N.E.R. 4-6-2, commercially built, which was a nice job to look at, and he thought well made, but it had very little power. It could run light, or pull an empty car, but could only manage to struggle along slowly with a boy on the car; and would not budge, even when blowing off at 80 lb., if he himself tried to get a ride. Reading in these notes, accounts of what my engines could do, could I suggest a remedy? The boiler apparently steamed well, though it had no combustion chamber. The cylinders were the famous "standard" $\frac{11}{16}$-in. bore and 1$\frac{1}{16}$-in. stroke, with one-piece steam-chests, and the valve-gear was Walschaerts, which he did not wish to alter.

When an engine won't pull under full boiler pressure, it is either faulty valve-gear or cylinders; and as the owner of the locomotive said the valve-gear was "well made, and he did not wish to alter it," I took his word for it, and gave him some instructions about reaming out the cylinders, and making and fitting new pistons. I assumed that the lubrication was in order, as he informed me that he had scrapped the original displacement lubricator, and made another to my instructions, this time a mechanical one, delivering into the steam-pipe tee. He wrote back and asked if I would undertake reaming the cylinders and fitting new pistons, but I don't undertake odd jobs for strangers (if I did, I wouldn't have any time to write these notes!), so he said he would try and see what he could do.

More Trouble!

Two or three weeks elapsed, and then came a letter saying he had reamed the cylinders and made new pistons, but couldn't reset the valves, because the steam-chests were all in one piece and had no detachable covers. I replied with detailed instructions, how to set the valves by sight, using a dummy guide, and transferring the setting to

the valves in their own steam-chests. Soon after this came another letter saying that he had got the engine together again, and still she was practically powerless. Once again I replied that he had better check up on the valve-gear, and see if it conformed to my specifications as given in these notes. In due course along came another letter, saying that it didn't, and if the valves opened correctly at one end of the stroke, they were all out at the other. By this time, as you may guess, the " school of correspondence instruction " had taken up far more time than I was able to afford, but once more I sent some hints on what to do.

The next letter was an S.O.S. The owner of the engine said that he was beaten, and was appealing to me as a last hope, as his small son was nearly broken-hearted because the engine wouldn't give them a ride, and asked me if I could possibly have it here, and see what was wrong. He added that the boy asked him to send it to me. As most readers know, I have a weakness for kiddies, and in a weak moment I consented. The owner said he hadn't got a box to pack it up in, for safe transit, so I said he could bring it down personally, if he had the time, as it wouldn't cost much more than sending it by passenger train at company's risk, and would save the job of packing. He agreed ; I gave him a date and time, and instructions how to get to my home, and in due course he same along.

The Usual Faults

When the wrapping was taken off the engine, one glance at it told me all I wanted to know, viz. : who made it, and what the faults were likely to be. I tried it over with the tyre-pump, and found the timing all out, both pistons and valves blowing, and one or two more little faults and failings ; but I told the owner that, provided the boiler was sound, I could make it pull him and his boy, and he departed in better spirits than he came. In due course, I stripped it down, and did up the ports and valves ; his new pistons were not too bad a fit, but they were made of brass, and soldered to the rods, evidently to prevent slacking of the threads. The bores were cleaned out, and the piston packing renewed ; the existing packing looked like chewed string.

Both return cranks were too long, and the eccentric rods were of unequal length. The owner said the valve-gear was well made ; suffice it to say I didn't agree. There wasn't a blessed fork joint either side, except the top of the combination lever ; and the links were box-pattern suspended one side, with a bit of plate over the open side, to prevent the die-block coming out. Anyway, one can do funny things to rods and links with an oxy-acetylene blowpipe, and I got busy with mine, so that in due course the " well-made " valve-gear at least had correct-size components, and the valves could be set accurately. I did not make new parts, as the owner wanted the expense cut to the minimum.

The lubricator had no pawl-springs, and it did not conform to my specification. However, it pumped when operated by hand, and when I freed the weighted pawls with a drop of paraffin, they functioned, so I thought it might do the doings on the road. The engine was reassembled, and I got up steam for a road test.

What He Didn't Say

The first thing that happened was that a cloud of steam and water started to envelop the foot-plate, and I found that the blower-valve was loose on the stay, the stay loose in the boiler, and the bottom fitting of the gauge-glass also loose and blowing. Nothing had been said by the owner about these little troubles ! I guess he thought that if he had disclosed *all* the faults, I wouldn't have tackled the job at all ; I had had experience of that already. Steam was let down, and the faults remedied ; I had a good look around, found one or two more, and corrected them before getting up steam again. Incidentally, I had to alter all the connections on one of my own tenders, to get a test at all, as those on the engine were straggled out anyhow, all different from my own. For example, the by-pass valve was located alongside the water gauge ! Anyway, steam was raised once more, and this time everything went like the proverbial marriage bell. I had given the lubricator a few turns by hand, and this had filled the pipe between it and the cylinder with oil. Provided the port in the pump doesn't bridge those in the stand, and the ratchet-gear is working, these lubricators will function without clacks at all. The engine ran all right, developing as much power as could be expected from the " standard " cylinders and other imperfections, and it covered a distance of two miles before the fire began to clinker. I forgot to mention that a brilliant point in the design was that the only place for air to enter the firebox, was between the trailing wheels ; the grate each side was completely blanked off by the flat top " wings " of the ashpan over the trailing wheels.

The Sequel

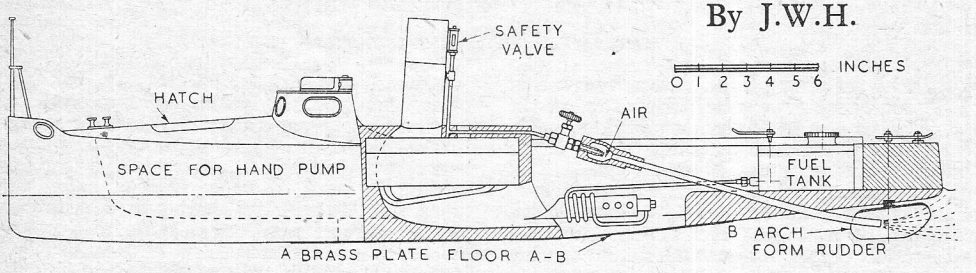
I wrote the owner, told him the engine had pulled me for two miles, and asked him to collect it, seeing it at work meantime. He came, and I took it around for a mile or so, then asked him to sit on the car behind me, which he did. The engine hauled the two of us for best part of another mile, but I had to hold the safety-valve down to keep the pressure, as the spring had " gone light," and the screwed nipple was down to the end of the thread. After the run, I looked at the lubricator and found it still contained plenty of oil. It had no cover, and thick oil had splashed on the pawl and prevented it clicking into the teeth ; so I advised the owner to put a spring on it. I also put a new spring in the safety-valve, and he took the engine away in a box loaned for the purpose, promising to return it.

To my utter astonishment, about four days after, I received a letter saying the engine was still useless and would not pull him ; oil was blowing out of the lubricator, and steam from the cylinders, and he was sending the engine back for further attention ! This was the first time in all my experience, that such a thing had happened, and I began to " smell rats." As the engine had pulled the two of us on my line for nearly a mile, I was rather inclined to tell him I wouldn't do anything more to it ; but curiosity got the better of me, so when it came, first thing I did was to dismantle the lubricator and see if the cylinders were getting oil. The spring put on by the owner

(*Continued on page* 388)

A Jet-Propelled Torpedo Boat

By J.W.H.



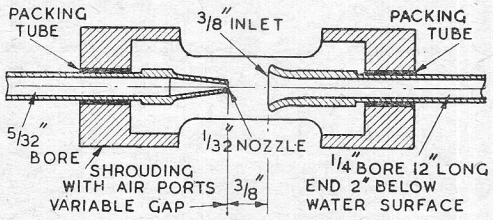
Part sectional elevation of a jet-propelled (metre) torpedo boat

IN 1884, Ward Lock & Co., of Salisbury Square, E.C., published an enlarged translated version of *Les Recreations Scientifiques*, by Gaston Tissandier, Editor of *La Nature*.

On page 774 of the English publication is given a description and illustration of a "Small Atmospheric Boat," fitted with a simple "pot" boiler and spirit lamp, and driven by a fine jet of steam which blows ten times its own volume of air down a curved pipe fitted through the stern of the boat, to emerge an inch or so below the water surface.

A. M. Salleron constructed the boat illustrated, but no dimensions are shown. Included in the description is a calculation showing the energy produced and a reminder is given that practical limits exist with regard to the size of boat which can be propelled effectively by this method, although no limit is indicated. No doubt many such boats have been constructed from time to time. However, the writer has made numerous experiments, with different nozzles and straight and curved pipes, which lead to the conclusion that this simple method of propulsion can very well be adapted at least to metre size boats, given careful attention to certain details. The latter concern particularly the shape of the stern, the proportioning of the nozzle and "stern tube" diameters, the gap between nozzle and "stern tube," the shape of the "stern tube" inlet, and also some lateral confinement of the air blast leaving the tube.

This method obviously avoids the weight of an engine and leaves additional space available in the boat. Automatic boiler feeding is still possible by an injector, or a hand feed pump can be used.



Typical experimental jet

The writer is proceeding to construct a metre size model, of 5½-in. beam and 2 in. draught, of an old type Thorneycroft shallow draught torpedo boat. This is not only well adapted to this kind of propulsion, but must be one of the shapeliest small steamboat types ever designed; the turtle deck and conning tower being especially attractive in the prototype.

To ensure an ample head and output of steam, firing will be by paraffin blowlamp, and the boiler will be of a type shown on page 188 of Mr. Henry Greenly's *Model Engineering*.

In this instance, the boiler barrel is 2 in. diameter and 6½ in. long, with four $\frac{5}{16}$-in. water tubes, all encased by heavy asbestos lagging.

Special importance is attached to the design of the rudder, not so much from a steering standpoint, but because this fitting is desired to act as an efficient deflector of the large volume of air suddenly escaping from the "stern tube" outlet and tending to spread in all directions, and not only directly astern.

The rudder therefore is to consist of a single curved plate, of inverted shallow "U" shape in vertical cross section, and in elevation very much as shown in the drawing.

The air blast will thus emerge centrally between the vertical sides of the rudder plate, and in a slightly downward direction. The available displacement is closely 10 lb. The underwater air blast obtained during the later stages of experimenting has been truly astonishing, and the writer would be glad to know of any other investigations along the same lines.

In the outline drawing herewith, the intended general layout is indicated in the sectional portion, but the jet and its perforated shrouding are shown only in diagrammatic form, as these are still subject to variation during experiments with the boat when afloat.

(Whatever may be the speed results obtainable, a most imposing "wake" is anticipated!)

The smaller drawing shows, in section, one of the various jets which have been experimented with, under different conditions of steam supply.

LOCOMOTIVES WORTH MODELLING

By F. C. Hambleton

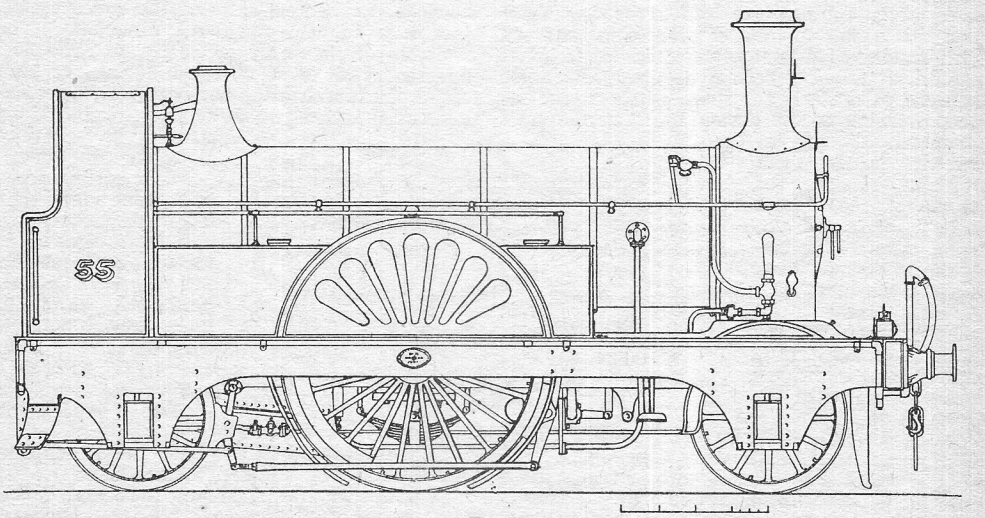
No. 17.—G.N. Railway, No. 1

WELL, of course, it had to come to it sooner or later! No series of articles on the older British locomotives could possibly be counted as complete without mention of the famous Great Northern Number One. This engine, together with William Dean's 7-ft. 8-in. single-wheeler, *Lord of the Isles*, was amongst the most popular iron steed ever placed on metals. Both evoked the utmost enthusiasm and admiration in their day—an admiration by no means absent even in these very modern times, and both engines have been modelled over and over again.

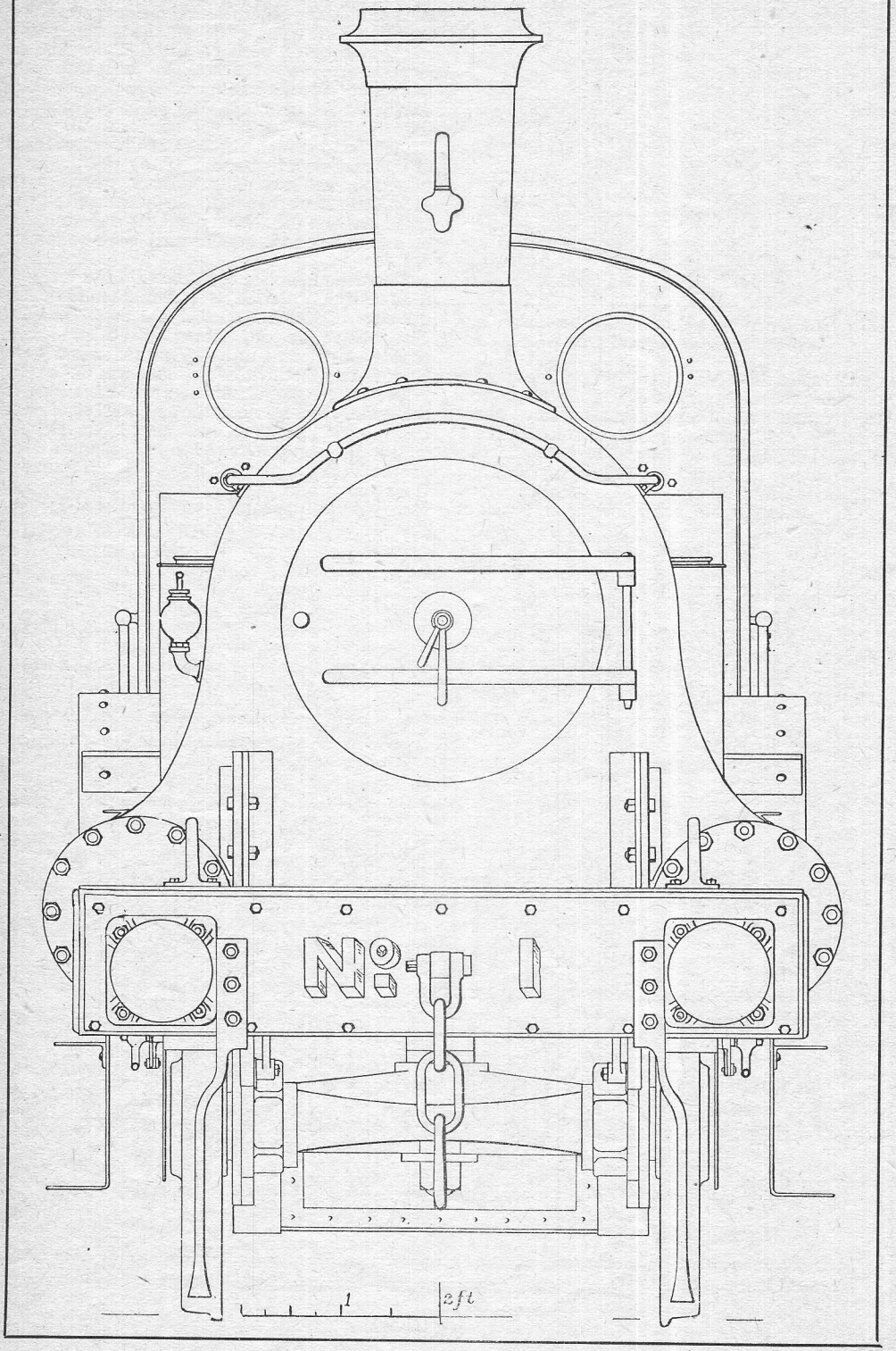
One would imagine that all that was worth saying concerning Patrick Stirling's masterpiece had been said long ago—and yet, truth to tell, there still remains one little chapter of her long life-story to be recounted. Strangely enough the missing section is Chapter One! So let me recount Number One's Chapter One!! Mr. Stirling had been in control at Doncaster barely a year when the first of his single-wheel engines made its appearance, this being No. 6, a charming little 2-2-2 with 7-ft. 1-in. driving wheel, and 17 by 24-in. cylinders. A dozen of these locomotives convinced their designer that a single pair of driving wheels gave all requisite adhesion, together with great freedom of running. Also he found that their rather small boiler (diameter only 3 ft. 10½ in.) fitted with 192 tubes as small as 1 9/16 in. diameter, furnished an ample steam supply.

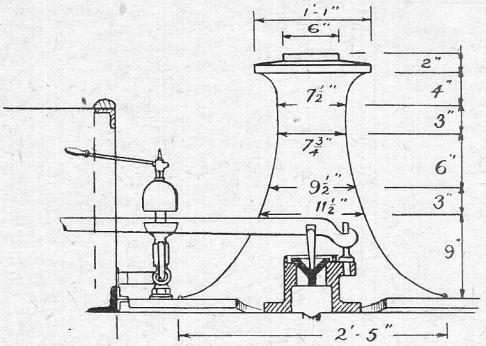
The next step was a design with even larger wheels and cylinders—the latter so big (18 by 28 in.) that they had to be placed outside the frames. Hence while the last half-dozen of the 7-ft. class (Nos. 55, 61, 63, 215, 37, 39) were being completed, the famous No. 1 received her finishing touches, appearing in 1870 as Doncaster Works No. 50. Stirling was a big-cylinder, small-boiler, man, and it is therefore hardly surprising to find the same diameter, both of barrel and tubes, together with the short 5 ft. 6 in. firebox included in the new design. So many loco-modellers are familiar with the outlines of No. 1 after her rebuild in 1880, when she was brought in line with later engines of her class, by being given the longer 6 ft. 2 in. firebox, larger 4 ft. 7½ in. trailing wheels, and longer main frames, that her original appearance may strike them as quite unusual. Nevertheless, she would make a lovely little model, and one, moreover, of great historical interest. Is it too much to hope that my drawings of her may inspire some lover of Stirling engines to set about this project with great enthusiasm?

Picture to yourself, good locomodeller, the *original* No. 1 in her beautiful green livery, her shapely cab and windows making harmonious curves when seen as a background to the slender and elegant brass safety-valve cover. (Stirling's first pattern—to be enlarged into something more massive and impressive as time went on.) Think of the play of the spokes and narrow balance-weight seen through the splasher-slots when in motion! By the way, she was the only eight-footer to boast eleven slots—and, she carries those splasher plates to this very day! Or picture the equally fascinating perspective when viewing a model from the tender forwards. Then one could see the curves of smokebox and cylinder, the lift of the footplate over the driving axle, and



Stirling's first 2-2-2 design for the G.N.R. Here she is in her later days when fitted with the big safety-valve casing, and other "modernisations." Note the vacuum brake ejector placed at the side of the smokebox


No. 9
1
2ft

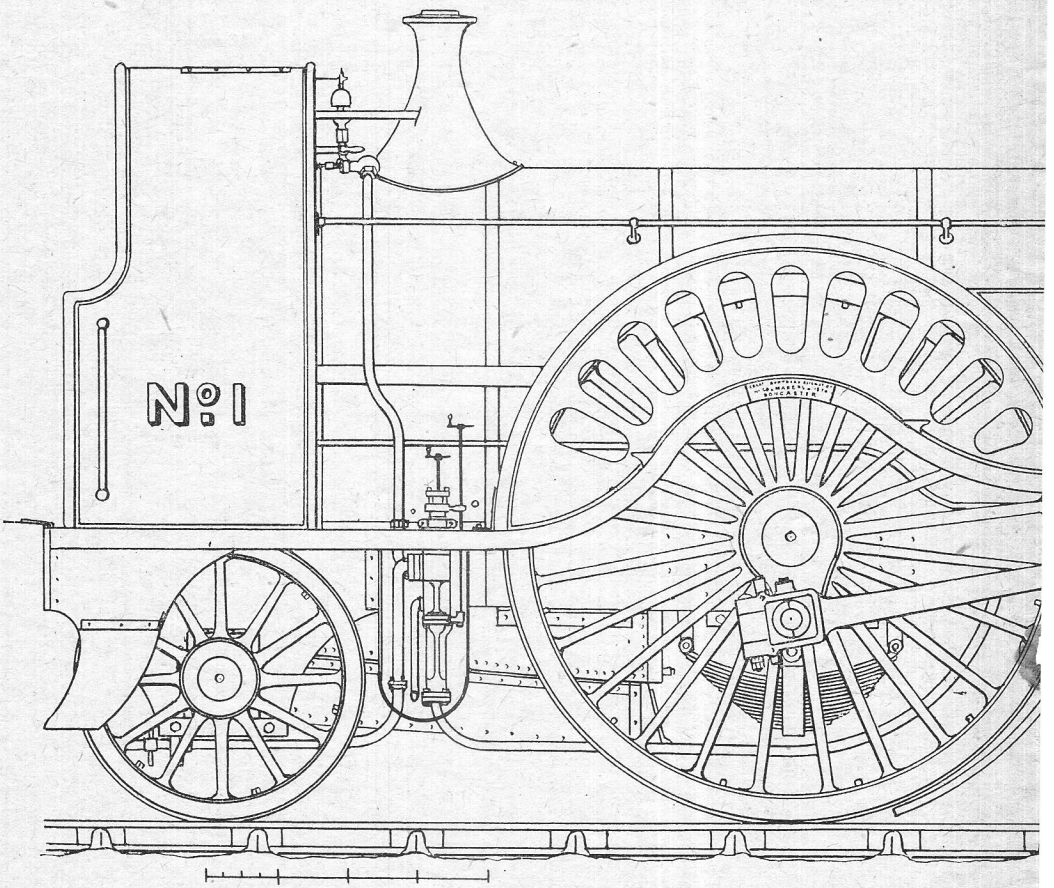


The first form of safety-valve, brass cover and whistle, as fitted originally to No. 1

that wonderful 2½-in. band of polished brass crowning the mighty splasher to perfection. Add to this the charm of a peep into her cab. There would be that fascinating shining steel regulator placed horizontally across the firebox, the two brass casings to the safety-valve springs and the elegant window frames, also in polished brass.

Oh! decidedly, No. 1 was one of the classics of all time! Many other features claim appreciative attention also. For example, there were many more touches of polished metal about her to mention—quite a list in fact. She had a nice bowl lubricator on the smokebox side; clack-box, complete with pet cock, showing just in front of the sand-box, bright copper injector steam pipes, the left-hand one of which passed down in front of the steel reversing-rod. Nearby was the sand valve-rod, and two brass injector wheels with their little knob handles. In later engines the space between the splasher and cab was occupied by a long box and these features were no longer visible.

Below the footplate could be seen the vertical-form injector protected by its semi-circular shield, the edge of which carried a fine brass beading. The massive big-end, connecting-rod, and heavy crosshead, cottered to its 2⅞-in. piston-rod were all gleaming features, not to mention the 1¾-in. brass beading that ornamented the outer edge of the bogie-wheel splasher, the long steel smokebox door-hinges, handles, and knob door-handle, whilst the smokebox hand-rail support was another fitting in polished brass. Viewed from the front the bright cylinder covers, and the big, early-pattern headlamp were also most attractive,

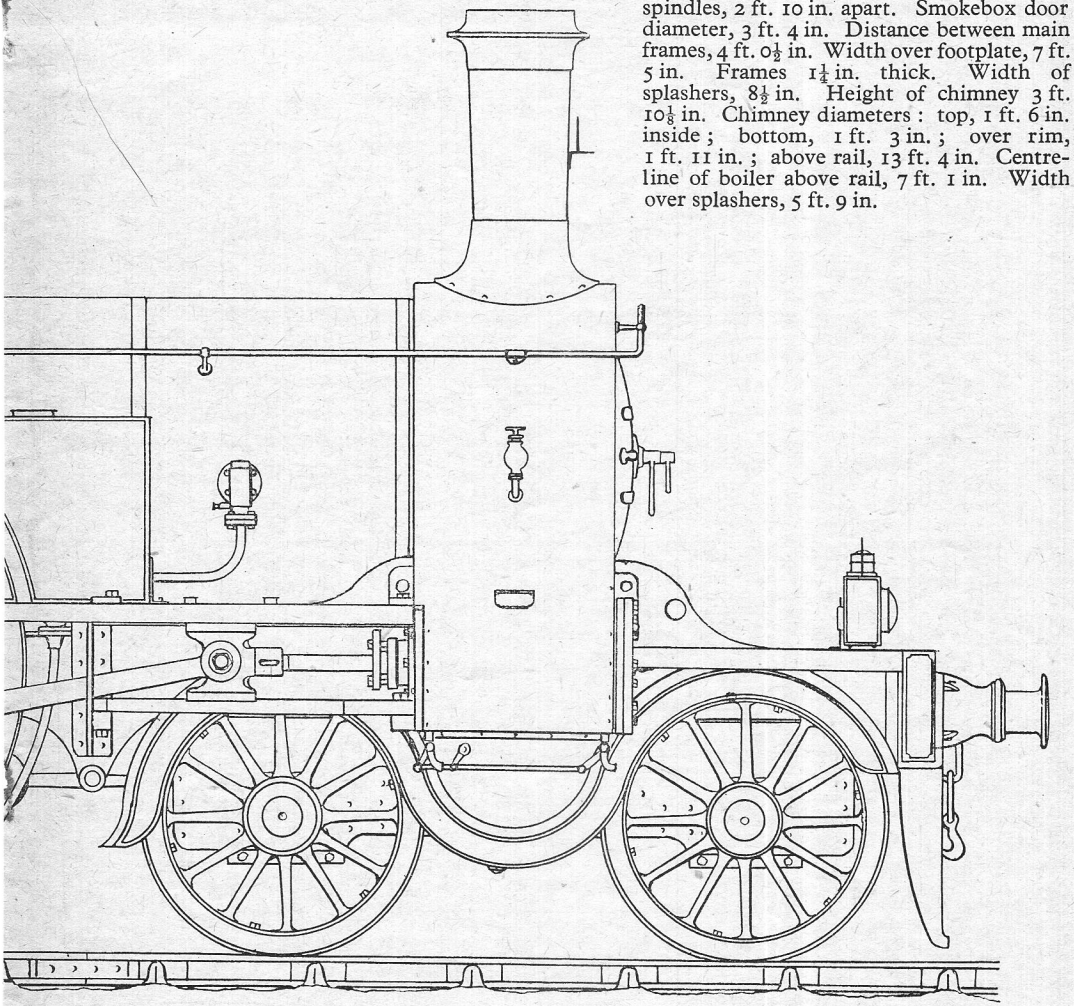


No. 1 when brand new. She then had a 5-ft. 6-in. firebox

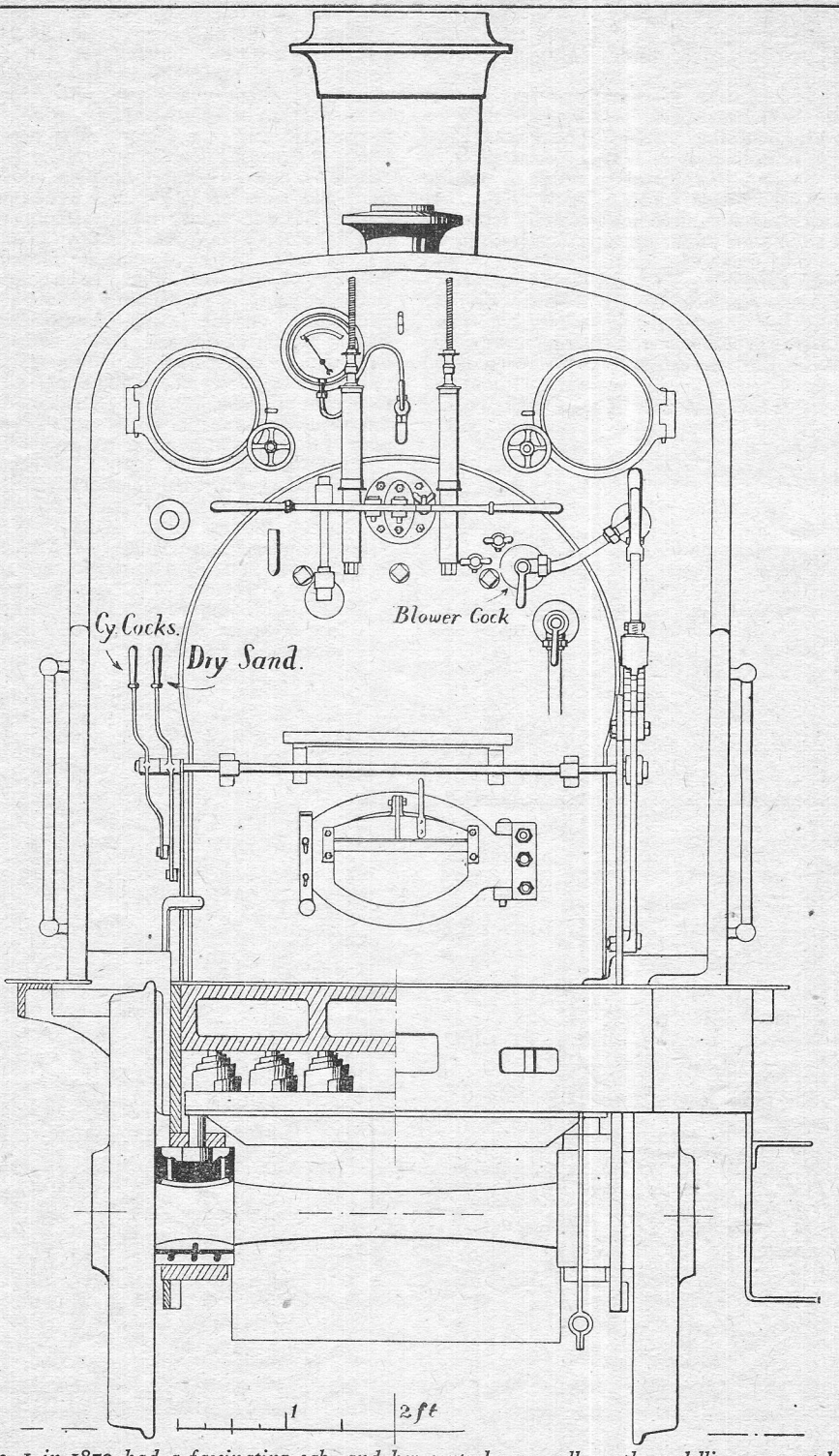
but there—I think by now I have mentioned enough to fan up the flames to model-making heat!

And isn't it nice to think that this famous engine is still in existence?—although it must be confessed that the would-be historians have effected such changes in her, the total effect of which amounts to the strange result of putting her into a condition which is really neither old nor new, and which does not truthfully represent her at any period of her working days! Still, we must not be ungrateful for their efforts. Would that both *Lord of the Isles* had been preserved to us for ever! And even if the odd Sturrock tender (more of this anon) and the vacuum hose-pipe, and the hybrid chimney strike jarring notes in the picture, at least we can say she *has* been saved from the scrapping yard through the wisdom and foresight of the good folk of Doncaster Works! And now for a few useful dimensions of the original No. 1.

Wheels: 8 ft. 1 in.; bogie, 3 ft. 11 in.; trailing, 4 ft. 1 in. Lengths: buffers, 1 ft. 6 in.; buffer beam, 6 in.; buffer beam to leading axle, 2 ft. 2 in.; bogie wheel-base, 6 ft. 6 in.; rear bogie wheel to driving-wheel, 7 ft. 9 in.; driving to rear axle, 8 ft. 0 in.; rear axle to rear buffer-beam, 2 ft. 6 in. Connecting-rod, 6 ft. 11 in. between centres. Height of footplate above rails: front and rear, 4 ft. 4 in., and 4 ft. 2 in., over second axle, 4 ft. 11 in.; radius of footplate above driving axle, 2 ft. $3\frac{1}{2}$ in.; radius of splasher, 4 ft. $3\frac{1}{4}$ in.; depth of outside frame, $3\frac{1}{2}$ in. Distance of slide-bars apart, 12 in. Radius of smokebox, 2 ft. $4\frac{5}{8}$ in.; radius of boiler lagging, 2 ft. 2 in.; outside length of smokebox, 2 ft. $9\frac{3}{4}$ in.; height of cab, 6 ft. 6 in.; width of cab, 6 ft. 0 in.; centres of windows, 3 ft. 8 in.; centres of windows above footplate, 5 ft. 4 in. Diameter of glass, 1 ft. 0 in. Distance between safety-valve columns, 11 in. Handrail above footplate, 4 ft. 4 in. Cylinders, 6 ft. 2 in. apart. Valve spindles, 2 ft. 10 in. apart. Smokebox door diameter, 3 ft. 4 in. Distance between main frames, 4 ft. $0\frac{1}{2}$ in. Width over footplate, 7 ft. 5 in. Frames $1\frac{1}{4}$ in. thick. Width of splashers, $8\frac{1}{2}$ in. Height of chimney 3 ft. $10\frac{1}{8}$ in. Chimney diameters: top, 1 ft. 6 in. inside; bottom, 1 ft. 3 in.; over rim, 1 ft. 11 in.; above rail, 13 ft. 4 in. Centre-line of boiler above rail, 7 ft. 1 in. Width over splashers, 5 ft. 9 in.



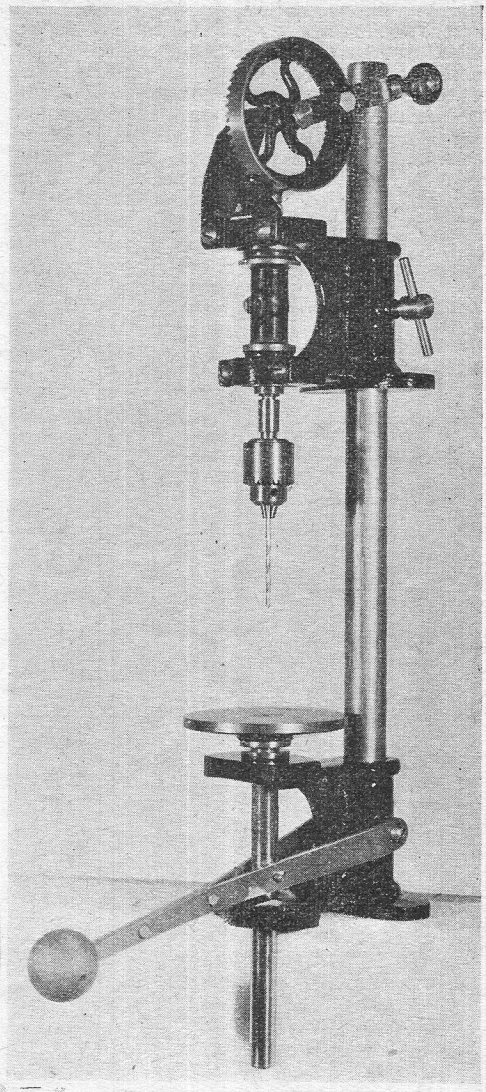
id small 4-ft. 1-in. trailing wheel. A very lovely engine indeed



No. 1 in 1870 had a fascinating cab, and her controls are well worth modelling accurately

A Simple Ball-Bearing Drilling Machine

By C. Blazdell



THE machine about to be described was constructed by the writer in an attempt to produce a small drilling machine capable of being easily and cheaply made, yet possessing considerable accuracy.

The following features were included :—

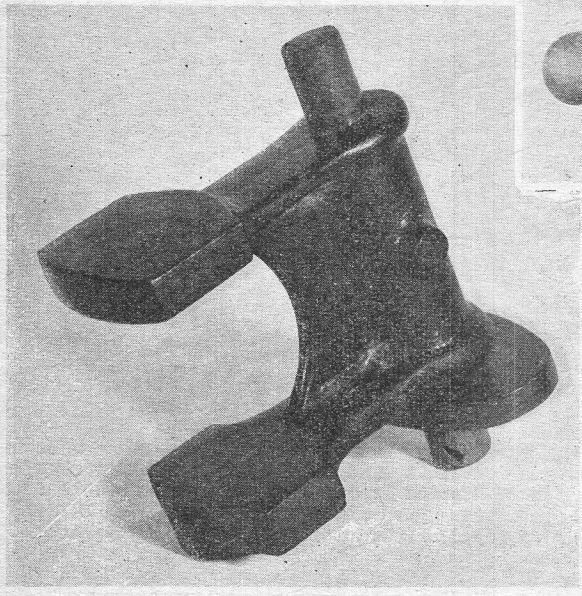
(1) Very free running ; a cycle hub being used for spindle and housing, thus providing ball-bearings for both thrust and journal loads.

(2) Ease of construction ; machining can be done on a 4-in. round-bed lathe and only two castings are required, both off the same pattern.

(3) Accuracy easily attained, as it depends only on the parallelism of four bored holes.

(4) Adaptable for hand or power drive and easily convertible to either.

One or two parts must, of course, be bought ready made, the chief being a rear hub for a standard roadster pedal-cycle. The hand-driving gear in the present case consisted of the bevel wheel and pinion from a forty-years-old hand brace. The chuck from the same source might have been utilised, but a good quality chuck of $\frac{1}{4}$-in. capacity was purchased.



Pattern for upper and lower castings

If a power drive is contemplated the necessary motor would need procuring ; a cone pulley would also be needed on the spindle.

Coming to the construction, a pattern was first made (Fig. 2) and two castings obtained in good quality iron. These will be referred to as the upper and lower castings and dimensions are given in Fig. 3 for the upper casting. The

lower is similar, but has different sized holes, as will be apparent later. The first operation on the casting was to mount it on the face-plate by what was to be its upper end and face off the lower surface, including the oval flange. This is rather tough work for the slender mandrel of a small lathe unsupported by the tail centre, so the really rough part of the work was done with a file in the vice, leaving only the final true surface to be produced in the lathe. Having obtained this surface it was then a simple matter to turn the casting end for end and mount it by the true face on the face-plate with the cored boss for the pillar central and bore out 1 in. diameter sliding fit for the pillar. It will be noticed the design of casting allows this to be done, as it swings just within the 4-in. radius or centre height of the lathe (see Fig. 3). This hole finished, it remained to slide the casting 3 in. across the face-plate and bore for the cycle hub in the case of the upper casting and the $\frac{5}{8}$-in. table spindle in the lower casting. The accuracy of the finished machine depends upon the parallelism of these four holes, but this should follow automatically when bored in this manner. It will be noted that neither centre distance nor exact size of holes on the two castings will affect accuracy.

The upper casting is sawn through the hub housing after first drilling and tapping holes for $\frac{1}{4}$-in. Whitworth set-screws, so making a split housing in which the hub can be tightly gripped.

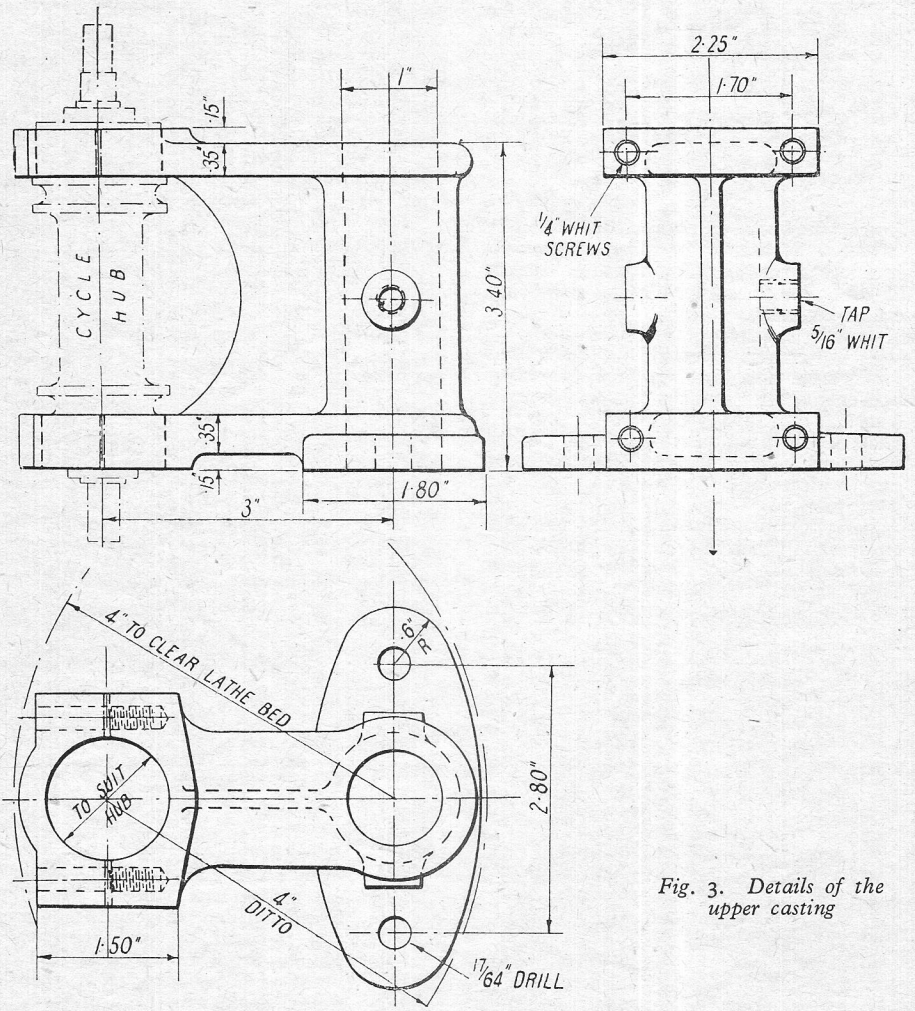


Fig. 3. Details of the upper casting

It will be noted that the lower casting is fitted with a bush at its upper end, that is the end nearest the lathe tailstock when being bored. The reason for this is that it would be difficult to get a rigid enough boring tool to reach the required depth if the diameter was restricted to the $\frac{5}{8}$ in. needed for the table spindle. The top end of this casting was accordingly bored $\frac{7}{8}$ in. to admit the boring tool and a brass bush turned up a driving fit in the casting.

The feed lever, Fig. 4, was made from a piece

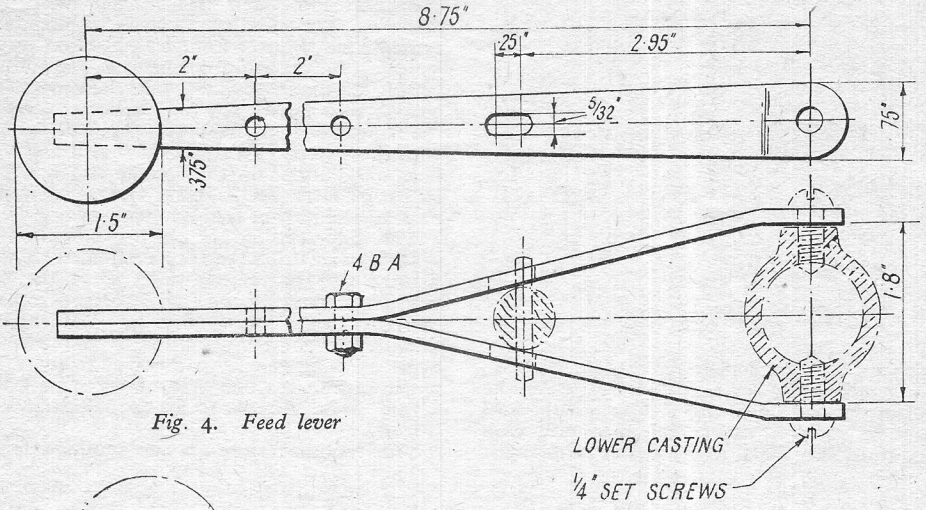


Fig. 4. Feed lever

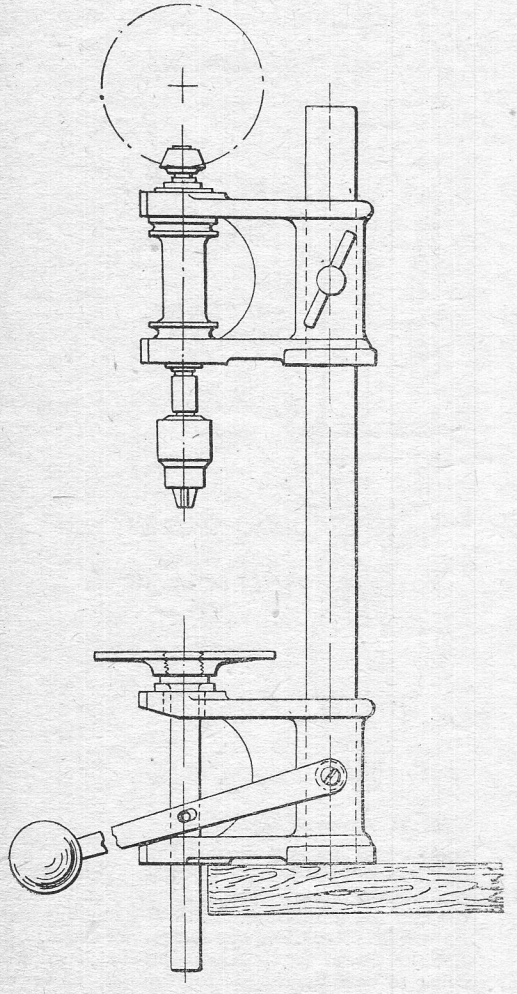


Fig. 5. General arrangement

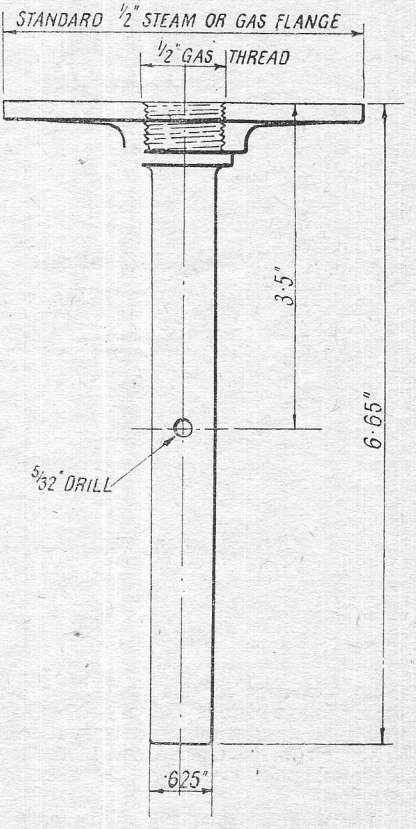


Fig. 6. Table

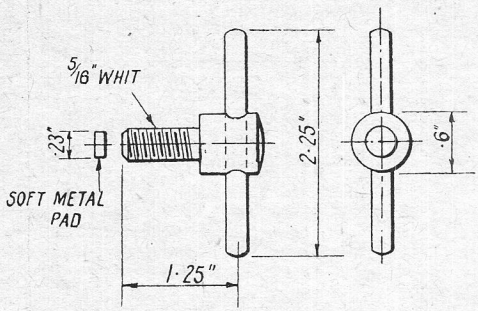


Fig. 7. Adjusting screw

of 10 s.w.g. duralumin plate about 1¼ in. × 10 in., sawn across on the angle necessary to secure the taper of the two sides with one cut. Mild-steel would be equally suitable, but duralumin is a delightfully easy metal to work, and its lightness is an advantage in this case. The knob was turned from a piece of Tufnol rod, but hard wood would be a substitute. It is just drilled and driven on to the tapered end of the lever, the construction of which will be clear from the drawing.

The drilling table, Fig. 6, is made from a standard steam or gas flange, which may be purchased for a few pence from most ironmongers. The spindle on which it is mounted is turned ⅝ in. diameter from a 1¼-in. or 1⅛-in. bar leaving a collar the full diameter at one end and cutting a ½-in. gas thread to take the flange. The centres were left in the rod, and after screwing the flange hard on, the latter was faced up true with the spindle. At the point shown a 5/32-in. hole was drilled in the spindle and a 1 5/16-in. length of silver-steel, slightly tapered, driven in on final assembly of feed lever and casting.

The lower casting has the two bosses on the pillar housing drilled and tapped ¼-in. Whitworth for the two set-screws which serve the dual purpose of carrying the feed lever and securing the pillar in the casting (Fig. 4). The length of these screws must be adjusted to nip the pillar while allowing the lever to pivot freely. The upper casting has one only of the same bosses tapped 5/16-in. Whitworth for the adjusting screw (Fig. 7).

The central feature in the machine is the spindle and housing adapted from the rear hub of a standard roadster pedal-cycle. This may be purchased from any cycle shop and Fig. 8 shows the hub and spindle before and after modification. As will be seen, the spoke flanges are turned off, also the thread for the chain-sprocket, leaving a collar to bear against the top limb of the upper casting and so take the thrust. The thread at

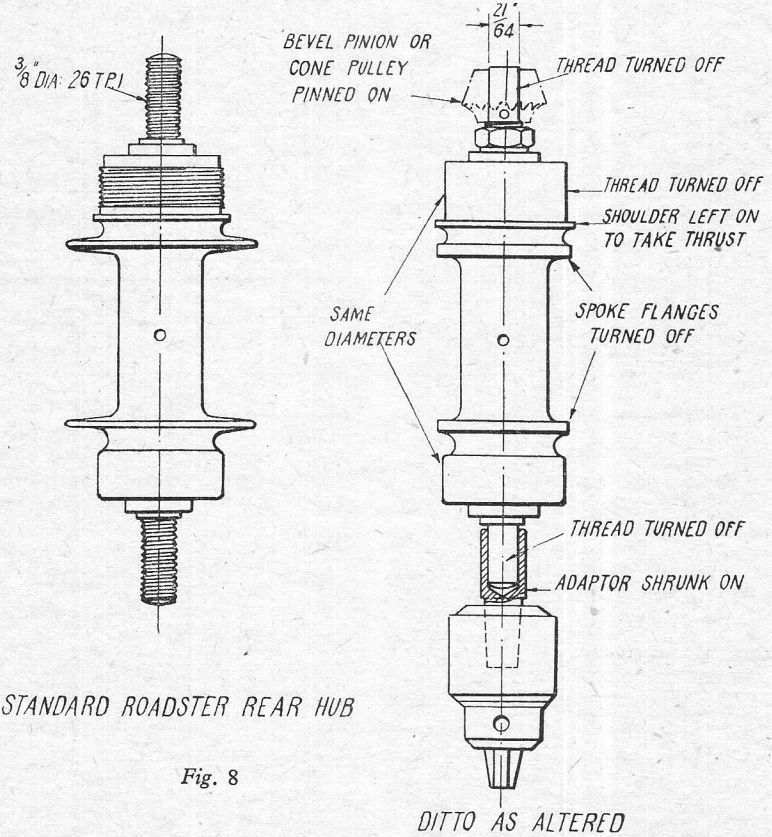


Fig. 8

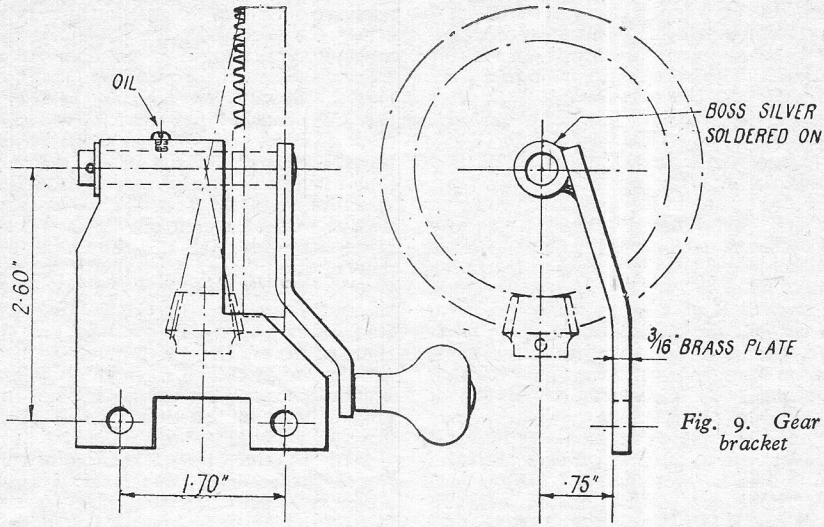


Fig. 9. Gear bracket

press, after which it was finish-turned true with the rest of the axle. There are alternative ways of achieving this result, but the above is, perhaps the simplest.

As before mentioned, the design may be adapted for any form of drive, but if a hand-driven machine, as in the photograph, is required, the dimensions of the bracket carrying the gear will necessarily depend upon the particular gears

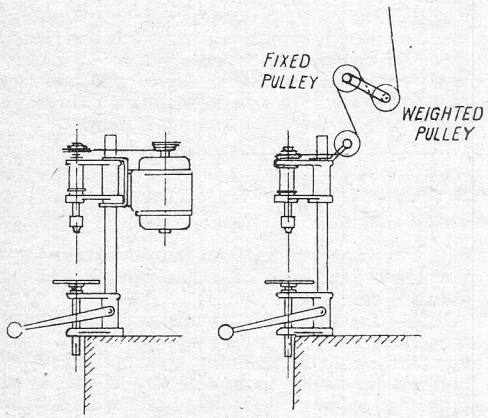


Fig. 11. Driving by motor or belt

both ends of the axle is also turned down to the bottom of thread. This is usually ⅜ in. diameter, 26 t.p.i., which will turn down to about 21/64 in. If the axle has its centres left in, this operation is facilitated, otherwise some careful centring is necessary in the four-jaw chuck, preferably using the ground surface of the "fixed cone" as datum. One end of the axle has the bevel pinion or cone pulley pinned on, the other takes the chuck. These chucks usually fit on a conical seating and as the diameter of the axle is not sufficient to make this, an adaptor must be fitted. This was rough-turned from a piece of mild-steel heated to redness and forced on the end of the axle, using the vice as a

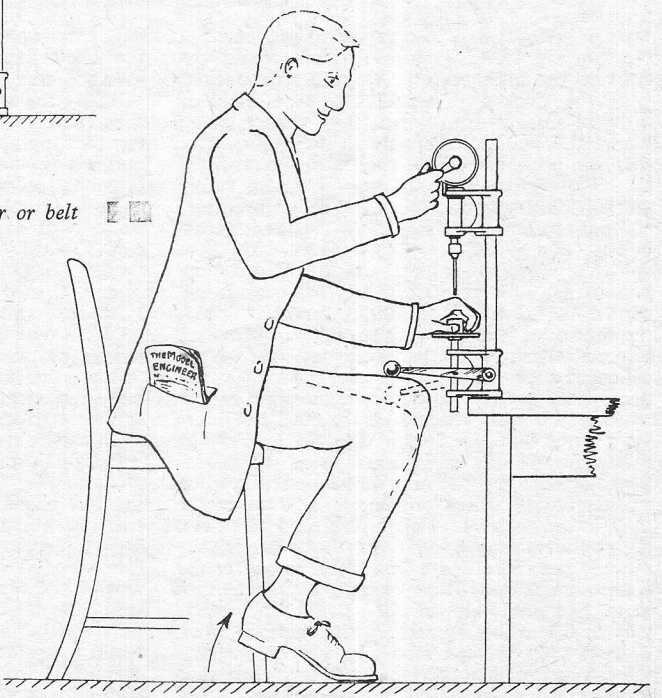


Fig. 10. Method of applying feed. Pressure applied by knee, lifting heel about toe

obtainable. In the writer's case the bevel wheel and pinion from an old hand-brace was used and Fig. 9 gives the approximate dimensions for this particular gear. The balance pinion or idler from the hand-brace was the one used, as even after forty years of work it was practically unworn. As shown, the bracket was made from $\frac{3}{16}$-in. brass plate with a cylindrical boss silver-soldered on to form the bearing for the wheel-spindle. The upper two screws in the top casting securing the cycle hub also attach this bracket. It may be found necessary to elongate slightly the holes in the bracket in a vertical direction to obtain the correct meshing of the bevel gear. A new crank handle was made from 10-gauge plate and set to clear the casting, the original knob being used. The wheel-spindle was a driving fit in the wheel and a washer and split pin secures it in position in the bearing. An oil-hole in the middle of bearing completes this part.

The method of applying the feed—by the knee—is no doubt open to criticism. But as one hand is needed to hold the work and the other to turn the crank, those who suffer from the handicap common in mankind of having only two hands, must needs employ some other part of the anatomy for this purpose. The method shown is by no means difficult—witness the smile on the face of the operator in Fig. 10—who, by the way, is not really drilling through his hand, as the sketch would appear to suggest. Actually quite a sensitive feed can be got in the way shown—lifting the heel about the toes—and the writer finds no difficulty in using drills as small as 15 thousandths in the machine.

If the bench is too high for the knee to reach the lever direct, "packing" in the shape of a piece of wood between knee and lever may have to be employed. If any inconvenience at all is found it is in using the larger drills—$\frac{1}{4}$ in. is the maximum capacity of the chuck—as the pressure needed to feed a drill of this size is becoming quite appreciable. It may be found, too, when drilling these larger holes that if mounted on a light or flexible bench top the base provided by the oval flange with its two holding-down bolts (Fig. 3), may be insufficient to prevent tipping of the machine under the feed pressure. In this case a hole can be drilled for a third holding-down bolt on the centre line of the casting between the table-spindle and the stiffening web. If the bench top is sufficiently rigid this should not be required.

With a power drive, a hand is, of course, left free for the feed lever. Suggested ways of applying a power drive are indicated in Fig. 11. A motor can be carried on a bracket bolted to the oval flange of the upper casting, or a round belt drive may be taken over pulleys downwards to a treadle drive or upwards to a countershaft; a jockey-pulley or other tensioning device will, however, be necessary in this case to maintain the tension in the belt, as the upper casting is raised.

"L.B.S.C."

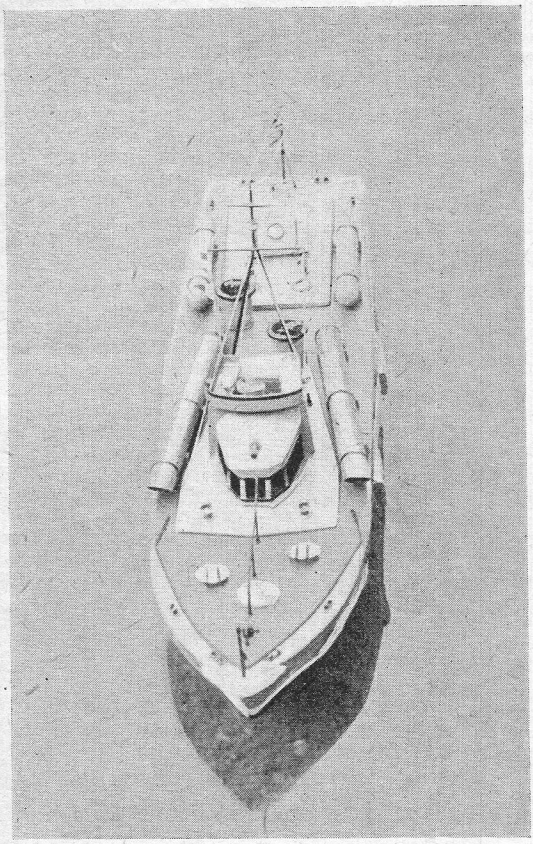
(*Continued from page* 376)

was useless, and wouldn't have prevented a bluebottle kicking; also oil was getting out between the sliding faces. But the prize-packets were the clacks! They had 5/32-in. balls on oversize seatings into which they almost sunk; whilst the bodies were only drilled 5/32 in., so that the oil had to force the balls, which fitted them like pistons, right up past the outlets before any oil could get out. When up, they stayed up!

I put the lubricator right, bored out the clack-bodies, and fitted 3/32-in. seatings with $\frac{1}{8}$-in. valves, also new unions, and a pipe with a cooling coil in it; got up steam, and once again the engine hauled me for two miles at a good speed, the lubricator now working perfectly. But when starting, there was a bad blow on one of the cylinders at one point of the stroke, which hadn't been there before; also the engine didn't seem to have the kick which even the small cylinders should develop, at 80 lb. pressure. Further investigation followed; first I tested the steam-gauge against my big one, and found it reading 15 lb. "slow," which accounted for some of the milk in the coconut. This corrected, I examined the cylinders again; both port faces were newly scored, and there was a small hole in one of the bores, which looked as though a fragment of metal had been chipped out. Being now utterly sick of the whole job, I did the same as when dealing with disliked school lessons in the days when I had my long curls; stuck at the job until it was done. The cylinders were rebored as big as the castings would allow, and proper bronze pistons made to suit, on new rustless-steel rods. The ports were refaced, and the valves trued up; the whole lot reassembled, and out we went on the road once more.

This time there was no mistaking the effect; the engine got away in fine style, and ran without any blowing up the chimney, good even beats and notched up nearly to middle, whilst the steam consumption was considerably reduced. I wrote the owner, told him to bring his boy, and they could both have a ride together; if the engine would do the job here, it would do it on their own road. They duly came; but before getting up steam, I told them what I had done to the lubricator and cylinders, and also asked them what sort of a track they had been trying the engine on, and what sort of car they used.

The small-cylindered, under-powered engine had been expected to do its stuff on a club track, fairly rough and far from level; but to crown it all, it had been expected to haul an adult passenger weighing over 14 stone, *on four wheels running in plain bearings*! It would have been as much as the boy could have done, to haul his father on two plain-bearing axles; can you imagine any full-size locomotive pulling over 1,000 tons in one four-wheeled coal wagon? I guess all the locomotives of the Camden shed, pulling together, would be unable to shift it; the weight would have set the bearings solid. Anyway, we got up steam; the erstwhile dud engine then flew around the line, first with me, then with the boy, then his father, and then the two of them; paterfamilias did one complete lap backwards, just to see if she would go in reverse!



A MODEL M.T.B.

S. J. Salt describes how—and why—it was built

MY ambition for years has been to own a lathe; but I could never afford the prices, so gave up. Then the thought struck me that I would build a model that would get me one. I could not decide what to build until a friend started to construct an M.T.B. hull; he got as far as the skeleton then lost faith, owing to lack of millimetre ply. I tried to persuade him to use paper; it did not sound possible to him, so he said that if I could do anything with his hull I could have it. I didn't want telling twice, and the photographs show my lathe earner complete.

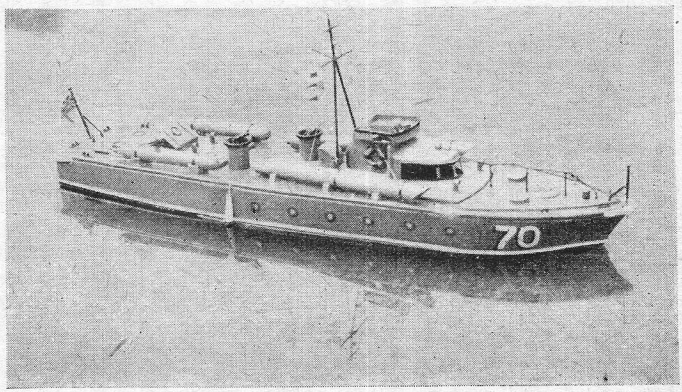
Well, I did finish it in paper; it is my first attempt, free-lance, and it is quite all right. The hull is 3 ft. long, so I used a scale of ½-in. to 1 ft. of the 70-ft. prototype. Measurements are: beam, 8 in., depth, 4½ in. 28 thicknesses of stout paper have given it surprising strength. The deck is of three-ply, scribed fishbone pattern and painted grey. Gun-turrets were made from No. 1829 torch batteries.

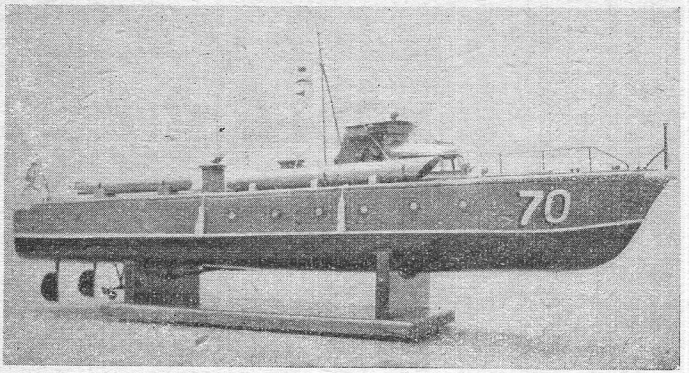
The cabin is of 22-s.w.g. steel in two pieces, and welded. The bridge is of three-ply and the wind-shield is tin. Torpedo-tubes are of aluminium and spare torpedos were made from the wife's mop handle (after persuasion).

The ports are fibre washers backed with celluloid, with the undersides painted silver and held with pins. I am no sign-writer, so I cut numbers from thin card, stuck them on with Casco glue, and then enamelled them. Lifebuoys were made from ply and string.

The next trouble was holding rudder-tubes in place; so I poured thin plaster of paris in the stern compartment about half full (I think this is called grouting), and also served as the necessary stern ballast. Rudders are operated by a slotted lever through the after-hatch which was hinged for the purpose and also houses the motor switch and rheostat. Bollards were filed up from 2½-in. nails in drilling machine and set in small plates drilled the necessary angle and sweated underneath.

Fairleads, guns and vents were cast in lead. I had bad luck with plaster moulds until I purchased the white plaster sold by chemists, which proved perfect. Compasses, searchlight and telegraph are from ¼-in. dowel, also shaped in the drilling machine. I was stuck for steering wheels until I saw my son playing with a small





lead cannon, the wheels of which, when drilled at each spoke, and pins inserted, were typical.

The propeller-shaft is housed in ¼-in. outside diameter copper tube, bushed at each end and packed with grease. The drive, at present, is by a 6-volt motor from a windscreen-wiper, and two 4-volt dry batteries. I am hoping to fit a petrol engine later, so I have left the glass out of cabin windows for cooling the cylinder. Fenders and rubbing-pad were made as in real practice, a piece of string, rolled in a triangular piece of linen, then plaited with thread. I had some difficulty in boring the hole in the hull for the propeller casing, which I finally had to burn with ¼-in. rod made red-hot. When finished, I stopped all leaks with plastic wood, well painted. The paper hull has eight coats of enamel and feels as solid as steel; the complete hull weighs 5½ lb.; with engine and decks complete, 12 lb., and it floats perfectly. I am not satisfied with the speed as yet, so I am experimenting with a 2-bladed propeller of larger diameter than the 3-bladed one first fitted which was only 1½ in. diameter.

Approximately 186 hours, spare time, were spent in building this boat, and very enjoyable they were.

Aluminium Formers

I HAVE recently made a 30-in. hydroplane, on the lines of THE MODEL ENGINEER design, but using a method of construction which suited my "production" and may interest other readers.

In short, the formers were cut from thin aluminium, with lugs provided for screwing to the stringers.

The merits of this method, are speed and easy production, as the whole set was cut out with snips, in an hour or so.

Not every model engineer is good at woodwork but anyone can make a good job of cutting thin aluminium sheet—even with scissors, if snips are not included in one's kit.

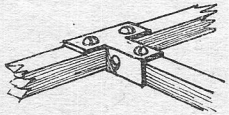
A little thought is needed beforehand to provide the lugs in the most convenient places.

It is also advisable that the surfaces of the lugs which contact wood, be roughened ("toothed" as woodworkers say), and glue applied before driving in the round-headed brass screws. The edge of the former next to the skin should be bent at right-angles to add stability.

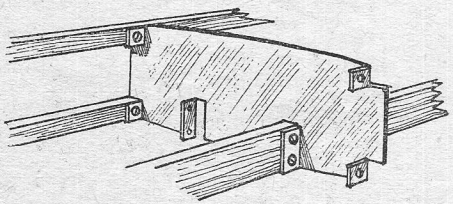
The forward coaming, transom and sundry small "jointers" were also made from sheet aluminium.

The appended perspective sketches should make the general details clear, and developments of the idea are fairly obvious.

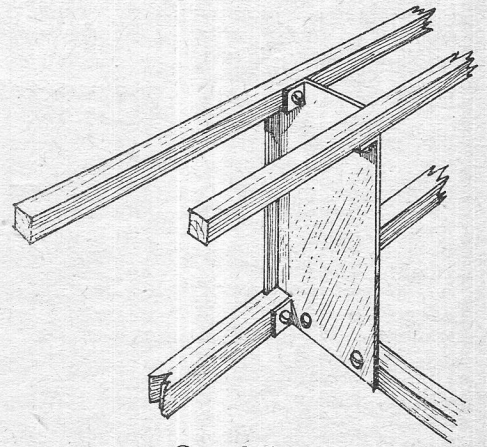
A further advantage should be mentioned, in conclusion. The complete set of formers will weigh only an ounce or two, and be amazingly strong, whilst a file is the only tool required to aid in fitting.—R. V. WORTH.



Jointer



Solid former



General view

Clubs

Mancunian Model Engineering Society

The talk on "Jet Propulsion Engines," given by our Mr. Chapman, September 27th meeting, was enthusiastically received, and the speaker was bombarded with questions. The answers were readily forthcoming, and the members were highly satisfied and delighted. Further items are on the agenda for future meetings and each week should prove interesting, instructive, and entertaining.

Hon. Secretary: J. MEADOWS, 90, Bank Street, Clayton, Manchester, 22.

Whitefield Model and Engineering Society

At out last meeting Mr. Neighbour gave a most interesting talk on the construction of "O"- and "OO"-gauge cardboard rolling stock. On Saturday, September 21st, the club entertained to tea, and a small exhibition of members' work, the delegates of the Northern Association of Model Engineers, who were at the school for a business meeting. Mr. Garside demonstrated his 5-in. gauge Mogul locomotive, but unfortunately the uneven flags of the schoolyard caused several derailments.

Secretary: A. STEVENSON, 2, Newlands Drive, Prestwich.

Grimsby and Cleethorpes Society of Model and Experimental Engineers

The above society holds its general meetings on the first Wednesday of each month, at their headquarters, Fletchers Yard, Wellowgate, Grimsby.

Last month Mr. G. Morby gave a demonstration of locomotive wheel turning, showing the excellent finish which may be obtained with carbide tipped tools.

The activities of the society are now directed towards the forthcoming exhibition, fixed for November 28-30th, at Augusta Street Barracks, Grimsby.

Entries from non-members would be welcomed Applications for entry forms should be addressed to :—

Asst. Hon. Secretary: K. T. SMITH, 8, Malmsbury Drive, Grimsby.

The West Riding Small Locomotive Society

Our next meeting will be held on Saturday, October 26th, at Blackgates (Tingley). A talk by two L.N.E.R. locomotive engine drivers.

Each Saturday there will be the usual working party doing constructional work on the railway at Blackgates from 2.0 p.m. Every additional pair of hands is very welcome.

Hon. Secretary: W. D. HOLLINGS, 8, Lime-tree Grove, Birkenshaw, Bradford. Tel. : Dudley Hill 299.

Cardiff and District Society of Model and Experimental Engineers

Again in conjunction with The Cardiff West End Model Yacht Club, plans for our forthcoming exhibition are now going ahead, and a cordial welcome will be extended to any lone hands or clubs in the district wishing to participate. The venue this year will be The Sea Cadets' headquarters, Penarth Road, Cardiff, and the show will be held for a week, commencing Monday, November 18th to Saturday, November 23rd.

Meetings are held first and third Wednesday in the month, Room 8, Y.M.C.A., opposite Queen Street G.W.R. Station.

Further particulars and forms of entry can be obtained from the Hon. Secretary, or Mr. J. A. Roberts, 40, Park Avenue, Whitchurch.

Leeds Model Railway and Engineering Society

For the Social Evening, at Messrs. Hayes Engineers Ltd., Geldard Road, Leeds, on Monday October 21st, at 7.15 p.m., Messrs. Hayes (Engineers) Ltd., have placed at our disposal the whole of their canteen facilities, and it is intended to have a real social evening. A rabbit-pie supper and entertainments will be provided, and we hope to make this event a really good "get-together" evening. It is hoped there will be a first-class response from all the members.

Hon. Secretary: F. H. NAYLOR, 3, Henconner Road, Chapel Allerton, Leeds, 7. Phone No. 41831.

Burnley and District Model Engineers' Society

The next meeting will be held on Friday, October 18th, at 7.30 p.m., in The Rechabites Hall, Accrington (Abbey Street). There will be a demonstration on so dering by Mr. J. D. Mee. Hon. Joint Secretaries: J. D. MEE, 2, Windsor Avenue, Church, Nr. Accrington. A. BATEY, 36, Moseley Road, Burnley.

The Society of Model and Experimental Engineers

There will be a meeting at 39, Victoria Street, Westminster, S.W.1, on Tuesday, October, 22nd, at 2.30 p.m., when Col. D. H. Chaddock, R.E.M.E., will deliver a lecture entitled "The Art of Experiment."

On Saturday, October 26th, there will be an informal stationary engine meeting at St. Peter's School, Great Windmill Street, Piccadilly Circus, W.1, at 2.30 p.m. This will be an opportunity for members wishing to try out their models under steam, or for I.C. engines to be run. These informal meetings are an experiment and will be repeated subject to support.

Particulars of the Society may be obtained from the Secretary, J. J. PACEY, 69, Chandos Avenue, Whetstone, N.20.

NOTICES

The Editor invites correspondence and original contributions on all small power engineering and electrical subjects, which should be addressed to him at 23, Great Queen Street, London, W.C.2. Matter intended for publication should be clearly written, and should invariably bear the sender's name and address.

Readers desiring to see the Editor personally can only do so by making an appointment in advance.

All correspondence relating to sales of the paper and books to be addressed to THE SALES MANAGER, Percival Marshall and Co. Ltd., 23, Great Queen Street, London, W.C.2.

Correspondence relating to display advertisements to be addressed to THE ADVERTISEMENT MANAGER, "The Model Engineer," 23, Great Queen Street, London, W.C.2.

"THE MODEL ENGINEER"
SALES AND WANTS

Private: **Threepence** *word. Trade*: **Sixpence** *word. Use of Box* **2/6** *extra*
Minimum charge, **3/-**

TOOLS & WORKSHOP

Buck and Ryan's Department for Lathes, Drilling Machines, Grinders, Electric Tools, Chucks, Surface Plates, Lathe Accessories and Tools.—310-312, Euston Road, London, N.W.1. Telephone: EUSton 4661. Hours of Business: 8.30 to 5.0 p.m., Monday to Friday; Saturday, 1.0 p.m.

Split Chucks for Watchmakers' Lathes, 6 mm., 6½ mm., and 8 mm., at 7s. each, postage 6d.—JOHN MORRIS, 64, Clerkenwell Road, London, E.C.1.

Infinitely Variable Speed Gear, ratio 16 : 1, materials supplied, leaflets—CROWTHER, 85, Charlotte St., Rochdale.

"Little John" Lathes. Sole Selling Agents for Home and Export. Send for illustrated literature and orders to—THE ACORN MACHINE TOOL Co. (1936) LTD., 610-614, High Road, Chiswick, London, W.4. Telephone: CHIswick 3416-7-8-9.

Clearance Workshop. Few bargains in unused H.S.S. End Mills, S. and F. Cutters, Shell Mills, Slab Cutters and other milling tools. Guaranteed quality and your approval. Send S.A.E. for full particulars. Bargains.—Box No. 4151, MODEL ENGINEER Offices.

3½" Plain Lathe, Treadle, gap bed, chucks, £10.—125, St. Lawrences Square, Newcastle-on-Tyne 6.

For Sale, No. 1 Adept Hand Shaper, £3 10s.; M.E. Bench Grinder, £3; M Type Myford Lathe, long bed and accessories, £65; Milling attachment, £3.—ALLEN, 108, Denecroft Crescent, Hillingdon, Uxbridge.

Atlas Bench Lathe, 5" centres, 36" between centres, screwcutting, with faceplate and change wheels, 400/3/50 motor drive, £40.—Box No. 4145, MODEL ENGINEER Offices.

For Sale, 3⅛" B.G.S.C. Lathe on stand, complete with built-in countershaft for power drive, and accessories, including faceplate, driver plate, chuck back plate, set of change wheels, drill chuck for tailstock, vertical milling slide, angle plates, etc., hardly ever used since purchase, £25.—E. E. EDGE, 27, North Avenue, Stafford, Staffs.

Atlas Tailstock Turrets, No. 600A, unbored, genuine American, absolutely brand new and in perfect condition. Packed in individual cases, price each, £7 15s., carriage paid (previous price £20 each). Only a limited quantity available. These attachments are also suitable for 5" "Sphere" Lathes.—THE ACORN MACHINE TOOL Co. (1936) LTD., 610/614, Chiswick High Road, London, W.4.

Surplus Materials. Round Brass Rods, 3/16", 7/32", 15/64", ¼", 9/32", 5/16", 35/64", ⅜"; Hexagon Brass, 9/32", ¼", 7/32", 3/16", 5/16"; Flat Brass Strips, 12" × 1½" × 30 s.w.g.; Round Bronze Rods, 5/32", ¼", 5/16", ⅜", 9/16", ¾". Brass, 1s. pound; Bronze, 1s. 6d. pound. Any quantity. Carriage extra.—BM/HARK, London, W.C.1.

For Sale 3" Winfield Lathe, B.G.S.C. chucks, steady, tool box, milling attachment ext., £25, new condition.—R. H. WILKINSON, No. 4, Oaker Hill, Flockton, Wakefield.

Wanted, 3" or 3½" B.G.S.C. Bench Lathe and accessories.—MORRIS, 146, St. Mark's Road, Wolverhampton.

3½" Myford-Drummond on maker's stand, self-contained motor and "Vee" belts. Indexed all motions, better than new, 230/1/50 motor. Present list price with accessories offered is £87. Local offers preferred.—SOWERBY, 175, Limthorpe Road, Middlesbrough.

Portass 3" Lathe, 3" chuck, faceplate, change wheels, etc., countershaft, reversing switch, 1/3rd h.p. 230 A.C. motor, £20; Myford 3½" Lathe equipped as above, but bench countershaft, £20. Both good condition.—75, Edenfield Gardens, Worcester Park, Surrey.

3½" Myford Lathe, 24" centres, complete with chip tray, 12 change wheels, faceplate, driver plate, 3" S.C. chuck, fixed steady, vertical swivelling slide, change wheel guard, countershaft, ¼" drill chuck, drill pad, motorised Drummond shaper, automatic cross traverse, complete with heavy C.I. stand; Ace Precision Pillar Drill, with ½ h.p. motor, as new, highest offer secures. S.A.E.—T. KNIGHT, Avendee, Friday Street, Eastbourne.

Wanted, Headstock 4", treadle, flywheel and bearings.—WELLS, Portway, Canon Pyon, Hereford.

Lathe Wanted, not under 3½" or over 6", S.S. & S.C., accuracy essential.—GREIG, South Zeal, Devon.

Lathe and Workshop Accessories, ½ Locomotive Chassis, Petrol Engine Castings, Electric Clock, Flying Aeroplanes, Radio components, Books, Blueprints. Stamped envelope details.—51, Redhill Drive, Brighton.

Wanted, Watchmaker's Lathe, complete with collets, 6 or 6½ mm. Must be Lorch or Boley, Urgent. State price and condition to—SIMMET, 7, Berryknowes Road, Glasgow, S.W.2.

Order with Confidence from A. J. Reeves, the mail order specialist. CH/CS Screws, 3/32", ⅛", 4, 5, 6, 7, 8 B.A.; ⅜"-½", 2s.; ⅝"-1", 2s. 6d. gross, steel; brass plus 3d. gross; 12 B.A. × ⅜" ch. hd. steel screws, 6s. 6d. gross; Whit. steel full nuts, 5/32", 4s. 6d.; ⅛", 3s. 3d. gross; ¼" sq. silver steel, 6d. ft.; copper tube, ¼" × 20-g., 1s. ft.; brass sheet, 20-g., 4s.; 18-g., 5s. 11d. sq. ft.; aluminium sheet, 20-g., 2s. sq. ft.; brazing spelter, 1s. bundle; 3s. lb.; iron rivets from 6d. gross; large range M/S and copper rivets, taps and dies, boiler fittings, materials, castings, etc., at reasonable prices. Cash with order or C.O.D. Comprehensive lists and samples gladly sent. Satisfaction or money refunded.—A. J. REEVES, 81, Cole Valley Road, Birmingham 28.

3½" Drummond Lathe, 12 speed drive from bench countershaft, 4½" S.C. chuck, drill chuck, tools, drills, etc., milling and gearcutting attachment, parting-off box. Many improvements, including felt wipers, graduated tailstock barrel, extra 2" feed to cross-slide, improved micrometer indexes to all slides. Used for 9 months only. First class condition, £82 10s. Available November.—QUICKSET TOOLHOLDER Co. LTD., 10, Floriston Gardens, Stanmore.

Wanted, 2" to 3" Lathe or Adept, compound slide rest, chuck.—26, Wishing Tree Road, St. Leonards.

For Sale, Latest 3½" Myford "M" motorised stand (without motor), fully equipped, chucks and many accessories, very little used. S.A.E. details—H. C. TILZEY, 43, Princes Street, Yeovil.

3½" Myford Lathe with Capstan attachment and cut-off slide, on stand, with countershaft, but less motor, £30.—FLEETWOOD SERVICE STATION, Leatherhead Road, Chessington. Epsom 9599.

Wanted, Complete Tailstock, top slide, change wheels, chucks, and other accessories for old type 3½" Drummond—UPSTONE, 64, Victoria Avenue, Barrow-in-Furness.

Wanted, Compound Slide Rest for 3" Zyto, or top slide for T.R. model.—"Folden," 6, St. Leonard St., Lanark.

Shaper, Hand bench type, as new, used only twice, complete with vice, tools, etc., stroke 7", cross feed (automatic), 13½", setover indexed head, £21 or best offer.—G. WHITEHEAD, Tan-y-Bryn, Coychurch, Nr. Bridgend, S Wales.

Wanted, Meccano Gear Wheels and Pinions, Nuts and Bolts, etc. Quantity and price to—STEWART REID, 91, Wales Street, Aberdeen.

Wood-Turner's Lathe Wanted. Also Turner's Tools and accessories.—BASSETT, 5, St. George's Road, Ilford, Essex. Val. 5635.

Carborundum Grinding Wheels for Tool Grinding, 8" dia., 1" wide, 1¼" bore, 6s. 6d. each; 6" dia., ¾" wide, 1" bore, 3s. 6d. each; 2½" to 4" dia., 1/16" to ⅜" wide, 1s. each, 9s. per doz.; Vices, 6" wide jaw, 16s. 6d. each.; H.H.S. Butt-welded Turning Tools, ½" square shank, approx. 5" long, 15/6 per doz.; ⅝", ¾", ⅞", Counterbores with round shanks, 3s. 6d. each; Miniature Sparking Plugs, 10 mm., 3s. 3d. each, 30s. doz.; 10" Hacksaw Blades, 2s. doz., 18s. gross; set of 10 best Carbon Steel Twist Drills, 1/16" to ¼", with numbered metal stand, 8s. 9d. complete. Reductions for quantities. Cash with order. Carriage extra.—N. R. BARDWELL, 473, Abbeydale Road, Sheffield.

Wanted, 3" to 4" B.G.S.C. Lathe, treadle drive, etc., good condition essential. Write or call.—PITTOCK, 23, Fifth Avenue, Manor Park, London, E.12.

9.5 Cine, 4" Lathe-bed Saddle, etc., countershaft, foot motor, bench drill, Olympiad chassis. Part finished Mill Engine, 200 MODEL ENGINEERS, 0-12½ mm. 3"-4" Micrometers. Wanted Printing Machine and Type.—Box No. 4156 MODEL ENGINEER Offices.

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Apex and New Atom Minor (Mr. Westbury's design). Engine castings of DTD 424, the famous alloy as used in Rolls Royce Aero engines, sp. gr. 2.56. Tensile 9 tons, lighter and far stronger than diecast, with most attractive finish. Carburettor castings (described June 14th issue "M.E."), and spiral timing gears for Apex; ball-races, piston rings, miniature plugs, contacts and other equipment. Send us your enquiries. Trade also invited.—THE HEADINGLEY MOTOR & ENGINEERING Co. LTD., 8, Otley Road, Leeds.

Pressure Gauges, ¾" and 1" diameter, 150 lb., 12s. 6d. each, 13s. post free. Cash with order. Delivery three weeks.—GIRLING, 32 Barbara Rd., Birmingham 28.

5" Gauge "Eve May" Chassis, and all castings, boiler material. Offers, or exchange for ¼ h.p. motor, vertical 0-½".—J. MULHOLLAND, Chemical House, Bathgate, Scotland.

For Sale, Stuart No. 10 Vertical Engine, new, Vertical Boiler, multitube 10¼" × 5", needs fittings. Offers to—SAUNDERS, 68, Downside Road, Sutton, Surrey.

Exchange ¾" Traction Engine. Very little work to finish, for coal-fired boiler and engine.—Box No. 4152, MODEL ENGINEER Offices.

Clearing Deceased Model Engineer's Estate. Five Locomotive Chassis almost completed, and a lot of body work done, but no boilers. Two 5" and three 2½" gauge Pressure and Water Gauges and Fittings. Offers over £80 only.—Box No. 4153, MODEL ENGINEER Offices.

For Sale, "O" gauge Pre-Grouping "L.B.S.C." Locomotives, Rolling Stock and Track. Seen 7-8 p.m. and Sundays.—49, Hillway, Highgate, N.6. Mount View 3635.

Finished Steel Track, Gauges "O" and "1," Horizontal Petrol Engine, 2¼ h.p., set Thornton Drawing Instruments, Steam Locomotive Parts, Boilers, etc. S.A.E. requirements.—NEWTON, 160 Whitepit Lane, Newport, I.O.W.

15″ Vernier Height Gauge, £10. 'Phone Hayes, Middlx., 1377.

For Sale, Boiler for 3½″ Gauge "Princess Marina," all brazed, tested 125 lb., no fittings; also 3 vols. of "The Steam Engine," by D. K. Clarke. Offers to—TAYLOR, 40 Church Street, Lenton, Nottingham.

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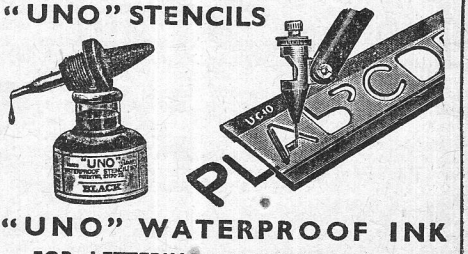

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